STANDARDIZATION

Formerly Industrial Standardization

News Magazine of the American Standards Association, Incorporated

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Readers Write

He's Proud of American Standards

University of Texas
Austin, Texas

Dear Admiral Hussey: In my capacity as Chief Scientist of the Scientific Section of the U. S. Embassy in London [Mr Woolrich recently completed his tour of service in this capacity] I have visited practically all the government-sponsored fundamental research laboratories and the engineering research laboratories of the universities of Great Britain. It developed in me a certain source of pride in the American Standards Association when I discovered that American Standards were being used quite generally by the British institutions as a guiding directive for much of their work. They often referred to American Standards as if they were a part of the stock and trade of Great Britain.

W. R. WOOLRICH
Dean of Engineering

"Quotable Quotes"

National Cash Register Company
Dayton, Ohio

Gentlemen: Short quotations and phrases which emphasize the advantages resulting from the use of specifications and standards would be helpful in emphasizing the importance of standardization. We are among the many plants that frame and post objective, thought-provoking briefs on a variety of subjects.

Do you have a list of effective statements concerning the value of specifications and related data which we could use?

R. W. WEBER
Specifications Department

• • From the material that was sent to Mr Weber, the following excerpts have been taken—

From papers by P. G. Agnew, past secretary and present consultant of the American Standards Association:

"The human element in standardization work is far more important than is generally recognized. Human diffi-

Company Members

More than 2100 companies hold membership either directly or by group arrangement through their respective trade associations

Readers Write

Continued

culties are usually much more serious than are the technical ones."

. . .

"A large part, perhaps the greater part, of standardization is essentially agreement on definitions."

. . .

"By constantly striving for *solutions*, the standardization method gets closer to fundamentals, not being content with superficial patchwork."

. . .

"The relation between research and standardization may be summarized by saying that standardization consists in finding the best way of doing a thing, and doing it that way—until a *better* way is discovered."

And from the works of Ernest Lhoste, late Director-General of the Association Francaise de Normalisation:

"To standardize means not only to work out standards, but also to apply them."

. . .

"Standardization is the art of disciplining oneself, in order to avoid being disciplined by others."

. . .

". . . it is not invention that constitutes progress, but the order of invention."

Opinions expressed by authors in STANDARDIZATION *are not necessarily those of the American Standards Association.*

Our Front Cover

Road-building is one field of construction usually handled by contractors — earth moving and paving. Other types are building and heavy construction. For the story on the association through which contractors coordinate information and establish standards, see page 213. Photo, Standard Oil Company, (N. J.)

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Standardization is dynamic, not static. It means not to stand still, but to move forward together.

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British Information Service

Transportation by Road and by Water

"Improved transport is the key to economic development in many parts of the world"

Technical Assistance For Economic Development

Standardization plays an important part in sound economic development

By Edmund A. Pratt

THE need for technical aid to the under-developed countries has been recognized for a considerable time and to a limited extent acted on by the United Nations and by the United States Government, but only since President Truman's enunciation of Point 4 in his Inaugural speech has the subject received much public attention. As far back as December 1946 the General Assembly of the United Nations took cognizance of this need. The Economic and Social Council has several times considered it since March 1947 and taken such steps as were possible within budgetary and other limitations. In harmony with Point 4, and on the proposal of the United States delegation, the Economic and Social Council on March 4, 1949, requested the Secretary-General to prepare a comprehensive plan for an expanded cooperative program of technical assistance for economic development through the United Nations and its specialized agencies. This article deals briefly with the application of standardization as a form of technical assistance, within the framework of that plan.

That standardization plays an important part in the achievement of a sound, balanced economic development cannot be questioned. But just how will standardization fit into the present proposals?

First, it must be clearly understood that economic development does not necessarily mean big steel mills, cement plants, or other projects that require great initial capital outlay for their construction, and advanced technology for their operation. There may be a few instances where such large scale development is warranted, but for the most part the need is for smaller and simpler things—but lots of them. A glance back over the economic development of the United States should afford sufficient proof of this assertion: Our own great industries did not spring full blown out of the void—it was a long and tedious path from the horse and buggy to the modern automobile, or from the pony express to the air mail.

What are some of these "smaller and simpler" things, and how can standardization help in making them available when and where they are most needed?

Two important examples will be considered in the following paragraphs.

Inland Transport

"Improved transport is the key to economic development in many parts of the world," says the Secretary-General's report to the Economic and Social Council; and it continues: "Most under-developed countries need better road transport, but improvements in inland water transport, rail transport and also civil aviation and marine harbor facilities are often needed."

Take the familiar question of good roads. In this country no road building authority could function without the constant application of standards—standard specifications for materials, standard methods of test, design standards, etc. Although the types of roads needed in the less developed countries are certainly not four- or six-lane express highways and may more nearly approach, in both design and method of construction, early modern roads in this country and elsewhere, the application of appropriate standards to their design and construction is important, particularly in view of the urgent need for economy in both materials and labor. The published list of American Standards includes some 40 standards applicable to bituminous types of road construction suitable for under-developed countries, and many others applicable to other types.

In the use of such standards under conditions for which they were not especially designed, various difficulties may arise. Added to the necessity of utilizing local materials to the fullest extent possible is the complication introduced by the climate, which in some countries may be an important influence, particularly where the lighter types of construction are concerned. Coupled with the unfavorable climatic conditions may also be the circumstance that in some of the under-developed countries primitive modes of transport, such as ox-carts or sledges, can be more damaging to the road surface than much heavier vehicles mounted on rubber tires.

Again, standard methods of testing materials may have to be adapted to local conditions. For instance, several ASTM methods of test for bituminous materials call for testing temperatures which at times can only be obtained in the field by artificial cooling, and this is not always practicable. In such cases tests may have to be run at higher temperatures and correlated to the standard test by a series of experiments on the particular materials concerned. Practical problems like these are frequently encountered when transplanting standards from the country for which they were designed to another country for which they are not particularly adapted, but where they may become useful guides after suitable amendment.

Mr. Pratt, *New York Consulting Engineer, is well known to readers of* STANDARDIZATION *as liaison representative of the International Organization for Standardization to the United Nations.*

British Information Service

In developing machinery standards—such as for a lathe—standards from highly industrialized countries can be adapted to fit the requirements.

In a similar manner the development of other forms of inland transport can derive profit from the rational application of standards. Rail transport is a field in which standardization has been extensively developed, but there are wide differences between the practices of various regions. In the field of civil aviation, standardization is carried out on the international level by the International Civil Aviation Organization (ICAO), more particularly with reference to operational features. Small airport construction in under-developed countries would involve many standards applicable to road construction.

Industrial Development

Economic development is not synonymous with industrial development, but the latter will obviously occupy an important place in any program such as that envisaged by the United Nations or the United States Government. The under-developed countries will require "assistance in determining the industries and industrial processes most suited to their resources and needs, in planning, constructing, equipping, managing and operating new industrial enterprises, and in introducing new machinery and techniques into existing industries" (Secretary-General's report to ECOSOC).

The adoption of appropriate standards with respect both to product and process, and to plant and equipment, may spell the difference between economic success and failure. To enable a new industry to survive with a minimum of tariff or other governmental protection, a reasonably high order of efficiency will be necessary. Much is to be gained by using existing standards of industrialized countries as background material, and utilizing the standardization process as a means of achieving better quality at lower cost, the elimination of unnecessary varieties, and speeding up the industrial process.

New ways and new techniques are essentials of industrial development. These demand that new skills be acquired and new habits formed. Among the new habits those affecting the safety of the worker are of great importance, especially where the success and permanence of the innovation depend on the continued cooperation of everybody participating in it. Safety codes and standards, such as American Standard B11.1-1943, Safety Code for Power Presses and Foot and Hand Presses, would be directly applicable to the types of industrial establishments likely to be involved in a program of industrial advancement in an under-developed country. Many other safety standards could also be used profitably, such as those applicable to abrasive wheels, occupational clothing and footwear, the textile safety code, etc.

In the preceding paragraphs two examples have been given of fields in which standardization can be an important aid in technical advancement. There are many others, including power development, sanitation and public health, and agricultural improvement. Some of these are within the scope of activities of the specialized agencies, such as the Food and Agriculture Organization (FAO) and the World Health Organization (WHO); others lie outside the purview of these agencies.

It is anticipated that the technical assistance needed by the under-developed countries will embrace expert help in the organization of administrative services. Such services might profitably include an office or directorate charged with the administration of a policy with respect to standards. A few of the under-developed countries already have some provision for technical standardization, but the majority of them have nothing of this kind, and are subject to invasion by the standards of other countries in accordance with commercial interests. Governments will obviously face the necessity of establishing a policy on standards, rather than leave the outcome to chance or commercial pressure. A properly coordinated program of economic development calls for the inclusion of such a policy and the establishment of a suitable organization or office to implement it.

Coordination of Standards Is Imperative

Economic development has many ramifications. No doubt several—perhaps many—projects would be under consideration in the same region at the same time, with technical help drawn from more than one country—possibly from more than one continent. The need for coordination of the standards to be employed on the many projects is clear. The experience of the industrialized countries would pay good dividends here; standardization could be made a tool for rapid advancement, rather than a subsequent corrective for a muddled situation. But it must be remembered that the pattern of standardization in the less developed countries cannot be expected to follow closely the pattern of the highly industrialized countries.

In many cases there will be need for international cooperation in standardization, at least on a regional basis. International trade in electric power, for instance, requires unification of voltages, frequencies, and other features of the distribution system. Transportation facilities also require international agreement where national boundaries are crossed, and this embraces many technical features involving standards.

A coordinated program for economic development presents a unique opportunity to establish in each country a permanent entity to formulate and supervise a policy with respect to standardization, which would derive the maximum of profit from the experience of other countries, while allowing full scope to local needs and preferences.

Management Takes Position On Standardization Policy

NAM President calls on industry to strengthen voluntary standards agencies

Statement by Wallace F. Bennett, President
National Association of Manufacturers

INDUSTRIAL TECHNOLOGY, in developing and improving our tremendous productive facilities, is not doing all of its job unless it makes progress also in introducing order into the necessarily complex skein of modern life.

The desirability of voluntary standards for scientific and manufacturing terms; standards of size; safety and sanitation standards, and many others, long have been recognized by business and industry. But they are far more than desirable; they are becoming increasingly necessary to the smooth functioning of our economy.

The National Association of Manufacturers, many of whose members have been active in advancing the voluntary standards movement, recently adopted through its Board of Directors a resolution urging that industrial management support and strengthen the efforts of trade associations, technical societies, and specialized standards organizations in the advancement of standardization and simplification.

Voluntary Standards— The American System

By their very nature, voluntary standards must be accepted by a vast number of interested individuals and groups, including both production and consumer elements. Therefore, it is essential that all who support the American system of individual responsibility and enterprise take active part in the voluntary standards movement—because the alternative is standardization which is not voluntary but directed and controlled by government.

We have ample and daily evidence toward complete economic control on the part of many Federal Government officials. In standardization as well as other areas of our economy, they are willing and eager to take over.

One of the reasons why standards should remain with industry rather than government is that they may be more flexible and may grow to meet expanding needs.

If standards become limitations, they are wrong. They must be constantly reviewed and corrected to represent technological growth of industry and the ability of industry to take its products into new fields.

If those who are engaged in the operation of our free competitive enterprise economy fail to do the job of promoting voluntary standards, there is little doubt that govern-

Resolution on Voluntary Standards

Adopted by the Board of Directors of the
NATIONAL ASSOCIATION OF MANUFACTURERS

Scientific standards, voluntarily developed within free enterprise, supply basic tools for management in the operation of industry and commerce. The rapid growth of technology makes them increasingly necessary to the functioning of our economic life.

Standards of size, that is, dimensional standards to insure interchangeability of parts and specifications for materials and supplies, are essential to modern production and distribution.

Standard building codes and materials specifications; standard definitions of commercial and technical terms; safety and sanitation standards; and standards for office, purchasing, accounting, and operating routines, for example, are likewise important to the efficient conduct of business.

There are many voluntary standards of these types which are capable of preventing innumerable controversies within and between groups, thereby obviating any need for government regulation in these fields.

Voluntary standards, of the type referred to, are of prime importance for national defense, both to government and to industry.

It is to the forward-looking self-interest of business that its executives should make adequate provision for the handling of standardization problems, first, within their own companies, and second, within their trade associations, and thirdly, within the professional and technical societies, in all cases to the extent that they are in the public interest and in no respect in contravention of Federal or State antitrust laws.

The National Association of Manufacturers, therefore, commends to the attention of management the desirability of promoting the development and use of sound voluntary standards, and the strengthening of such efforts, to that end, on the part of trade associations, technical societies, and specialized standards organizations.

ment agencies will move toward making this field their own.

The Federal Government is interested in industrial standardization, first as a purchaser of an extraordinarily wide range of materials and apparatus and, second, through its service and research bureaus whose function it is to develop facts and information as a service to industry and commerce. But Federal agencies, like regulatory bodies of state and municipal governments, can deal only with part of a larger problem which must be coordinated on a national scale giving voice to all parties at interest.

At the forefront of the voluntary standards movement is the American Standards Association, a federation of trade associations, technical societies and consumer groups. More than 500 organizations, including government agencies, are cooperating in the development of such projects as standard building codes, mechanical standards, highway traffic standards and safety codes, electrical and radio standards, mining standards, and consumer standards. More than 1,000 American Standards have been codified through the procedures of the ASA in its 30 years of existence.

In reaching agreement on these 1,000 American Standards, groups cooperating through the ASA have performed a highly commendable and valuable service in a difficult field. Numerous recurring problems in both industry and everyday life have been solved through this specially adapted machinery which permits industry, labor, consumer, and government representatives to reach a consensus.

Job Will Never Be Wholly Completed

Yet the greater part of the job of establishing needed voluntary standards still lies ahead; indeed, it never can be wholly completed so long as we have scientific and industrial progress to bring forth new inventions, new products and processes, and improvements on existing ones.

As the NAM resolution points out, a number of criteria, such as standards of size, dimensional standards to ensure interchangeability of parts, and specifications for materials and supplies—are essential to modern production and distribution.

In war, standardization means the saving of lives, perhaps the victory itself. Who can measure the contribution toward the winning of the last war of standardized parts and sections in ships and planes and weapons? Surely without such standardization, the struggle would have been greatly prolonged, if not lost.

Standards Are Essential For Peacetime Production

In our peacetime problems, voluntary standards are likewise essential. The nation's industrial plant has piled upon its amazing wartime production a postwar production of goods far exceeding that of any comparable previous peacetime period. But costs, and hence prices to consumers, are high.

Already it has been argued that only government is equipped to deal with the question of consumer standards. The validity of this argument will be tested by the willingness of private management and other private groups to demonstrate their leadership.

Standards can best be advanced by voluntary agreements, democratically arrived at by the action of individuals and groups which have specialized knowledge, and day-to-day actual experience, in dealing with the problem in each area where standardization can speed production and reduce costs, promote safety and health, or where all the steps from production to consumption can be taken more swiftly, easily, and confidently because of standardized parts, dimensions, processes, and performance specifications.

The resolution was presented to the NAM Board of Directors by Howard Coonley, Roger E. Gay, and John R. Suman. Mr Coonley was for many years chairman of the board of the Walworth Company, and during the war, headed the Conservation Division of the WPB. He is now devoting substantially all of his time as chairman of the Executive Committee of the American Standards Association. A former NAM president, he is now an honorary vice president of the NAM.

Mr Suman, vice president and director of the Esso Standard Oil Company, and Mr. Gay, president of the Bristol Brass Company, are both directors of the NAM and the American Standards Association, the national clearing-house for standards mutually agreed upon by all interested groups, from producer to consumer. Mr. Suman represents the American Petroleum Institute, and Mr. Gay, the Copper and Brass Research Association on the ASA Board.

While the need for standards has not been seriously questioned by any responsible group, one phase of the process must be made crystal-clear to the public—that the standards developed and cleared through the ASA and cooperating groups do not lessen competition. Business and industry, and technical trade groups concerned in promulgating standards, must carefully scrutinize every proposed standard to make certain it is in the public interest; that it does not deprive the public of free choice in the range of price, quality, function, and service, and that it is in no respect a contravention of Federal or state antitrust laws.

Voluntary standards in industry, it should be plainly understood, are voluntary in both their formulation and in compliance. No manufacturer, within or apart from the trade association or technological society responsible for promulgation of a standard, is precluded from deciding whether to manufacture in accordance with it. No attempt is made to compel compliance, by the ASA or the associations and societies which join with it in clearing a standard.

In these times of increasing governmental regulations and control of business, management is constantly hampered in its efforts to perform its essential task—to provide a continuously swelling supply of better and cheaper goods in a free market, wtih wider opportunities for jobs and expanding purchasing power.

Business will be overlooking a highly valuable, fundamental technique of management if it does not make the widest use of voluntary standards to effectuate production economies, to speed the flow of parts and materials, to increase total production and plant productivity, and finally, to assure the American people that its competitive enterprise system is fulfilling its obligation to make possible a better life for Americans under a sound and strong national economy based on individual freedom.

Spanish Standardization Chief Dies

D. Martin Bolzola, Spanish chief of standardization, died recently following an accident which occurred during inspection of a factory.

Antonio Gonzalez de Guzma, general secretary of the Institute Nacional de Racionalizacion del Trobaja Madrid, is acting temporarily as chief of standardization.

How Highway Safety Can Be Achieved

The need for uniform traffic regulations, signals, and road markings is stressed as safety program calls for action in promoting highway safety

ALTHOUGH progress has been made in the reduction of accidents on the streets and highways of the United States during the years immediately following World War II, traffic accidents are still claiming approximately 32,000 lives and causing injury to more than 1 million persons each year, it was pointed out at the President's Highway Safety Conference held in Washington, D. C., June 1, 2, and 3. This highway safety program has the cooperation of state and local governments with the support of individuals and members of national organizations.

The conference in June had as its principal purpose to assess what has been accomplished—how, when, and where—and to devise ways and means to further apply the program.

Reports of the technical committees on laws and ordinances, engineering, motor vehicle administration, and the report of the action program committee called attention to the need for further action on standards and greater uniformity of practice as one means of promoting highway safety. It was reported, for example, that lack of uniformity, in present state traffic directives, in state traffic safety codes, and in adoption and use of motor vehicle inspection laws has caused many potential hazards.

Not the least of the present hazards exists because of conflicting state traffic directives, reported the committee on laws and ordinances. For instance, a large number of states require that a signal of intention to turn or decrease speed shall be given either by means of a mechanical or electrical device or by means of the hand and arm. The right turn is indicated by extending the hand and arm upward beyond the side of the vehicle; left turn, by extending the hand and arm horizontally; intention to slow or stop, by extending the hand and arm downward at the side of the vehicle. Motorists in states having such standard three-position and distinctive hand and arm signals are confused, it was reported, when motorists from other states either give no signal because none is required in their home state or give only one form of signal—extending the hand and arm horizontally to indicate that a movement of some kind is to be made. It is not clear from this signal whether the motorist intends to turn right or left or stop.

The committee on laws and ordinances also revealed that the divergence in regulations governing turning movements is another potential cause of traffic accidents. A few states require that vehicles shall pass beyond and around the center of an intersection in turning to the left. In many instances this rule imposes impossible conditions and cannot be observed or enforced. On narrow rural highways and many city streets it would be impossible for the operator of a bus or truck or combination of vehicles to make a left turn in this manner.

To supply the states with a standard as a basis upon which state traffic laws and municipal traffic ordinances can be made uniform, the Uniform Vehicle Code and the Model Traffic Ordinance were developed. In 1924 the then Secretary of Commerce called a national conference on street and highway safety, attended by representatives from every state. A number of national associations cooperated with the Department of Commerce in organizing and financing the conference. This first National Conference on Street and Highway Safety appointed a committee on the uniformity of laws which during the period from 1925 to 1926 prepared the original text of the Uniform Vehicle Code. This code was last reviewed by the reorganized National Committee on Uniform Traffic Laws and Ordinances in 1947-48.

The National Conference on Street and Highway Safety also prepared the first Model Traffic Ordinance in 1927-1928. It was last reviewed by the committee on uniform traffic laws and ordinances of the President's Highway Traffic Conference in 1945. The Model Ordinance is intended to supplement state vehicle codes and to provide the basis for municipal traffic regulations.

As changes occur in highway design, in the increase of traffic volume, and as experience arose in the application of various code and ordinance provisions in the several states and municipalities, revision of or additions to the text of the code and ordinance will be made.

During the period from 1926 to 1949 the Uniform Vehicle Code, of

Governors' Conference Urges Use of Transport Standards

Acting on the recommendations made at the President's Highway Safety Conference, the 41st Governors' Conference which met at Colorado Springs in June asked the Council of State Governors to study the needed establishment of "reasonable and uniform maximum standards" for motor truck transport in each state. The council was also urged to prepare in cooperation with groups active in this field suggested state legislation to bring uniformity through vehicle laws to traffic control, highway markings, signals and rules of the road. A request for the improvement of driver licensing systems was also made.

which there are five Acts, and the Model Ordinance have been widely enacted. This has brought about very substantial progress toward uniformity in traffic laws and ordinances.

Different Regulations Exist in Many States

However, this attempt at uniformity has not been nationwide. Divergent traffic regulations exist among states as a result of the fact that many states that have enacted one or more acts of the Uniform Vehicle Code during past years have not revised their state laws to comply with revisions of the code. Many other states have incorporated verbatim various sections of Act V which covers the uniform act regulating traffic on highways, including rules of the road and equipment provisions. In revising their operators' and chauffeurs' license laws some states have incorporated some but not all of the basic provisions of the code's Act II, dealing with the uniform motor vehicle operators' and chauffeurs' license act. Only 45 states have adopted one or more of the acts of the code other than Act III which deals with the uniform motor vehicle civil liability act.

Moreover, although the code recommends a periodical inspection of motor vehicles, trailers, and semitrailers, only 15 states are required by state law to hold these inspections. One state that passed an inspection law in 1947 repealed it this year. In 8 states vehicle inspection is required by city ordinance.

Being well aware of the danger when there is lack of uniformity in the state vehicle inspection programs —where they exist at all—the committee on engineering of the conference strongly recommended that the vehicle testing procedure of all states be based on the American Standard Inspection Requirements for Motor Vehicles, D7.1-1941. The committee on motor vehicle administration also stressed the use of the American Standard inspection requirements and the use of the Motor Vehicle Inspection Manual. This latter is a joint publication of the American Association of Motor Vehicle Administrators and the National Conservation Bureau (now the Accident Prevention Department of the Association of Casualty and Surety Companies). The most recent edition was published in 1940.

The code sets minimum standards for safe performance of motor vehicles that can be used as a guide in inspecting a motor vehicle and does not attempt to cover establishment of a motor vehicle inspection system with its numerous legal, organizational, and administrative aspects. The manual, however, is designed to aid states and municipalities in putting the code into effect and to foster standard procedures for setting up and operating inspection stations.

The universal use of safety glass in windshields has greatly reduced the hazard to motorists of shattered glass, but the groups responsible for the safety glass standard are now facing the problem of reducing the impact hazards due to the strength of different types of safety glass.[1]

Bumper Height Is An Unexpected Problem

Bumpers, too, present a problem that is not as simple as it may at first appear. The height of the bumper may vary momentarily as much as 7 or 8 inches between acceleration and braking, thus aggravating locking. In addition, the problem of making the ends of the bumper proof against hooking cars while preserving its ability to absorb shocks is not easy to solve. This matter has been the subject of study by the Society of Automotive Engineers which has issued a new standard for bumper heights to which new models are being designed.

In spite of engineering efforts to reduce traffic accident hazards, many other problems remain. In addition to economic difficulties in interstate transportation, for example, the lack of uniformity in the size and weight restrictions of commercial vehicles is another cause of accidents. Compared with passenger cars, large, heavy commercial vehicles occupy more roadway space and frequently travel at much lower speeds on ascending grades. Consequently, there is the danger of serious collisions between passing vehicles particularly on long, steep grades. At least three committees of the President's Highway Safety Conference strongly recommended that all states adopt the uniform size and weight limitations agreed upon by the American Association of State Highway Officials. It is believed that if uniform standards were ratified by a majority of the states, much of this problem would be solved. Uniform standards governing the maximum dimensions, weight, and speed of motor vehicles operating over the highways are considered necessary to establish one of the fundamental prerequisites of highway design, to promote efficiency in the interstate operation of motor vehicles, to promote safe highway transportation, and to establish a basis for regulation of the many relationships between the dimensions and weights of motor vehicles and the strength and capacities of existing highways.

According to a report made by the committee on laws and ordinances, another accident hazard exists because there is a lack of uniformity in traffic signs, signals, and markings, and their legal meanings. This is despite the many years of work that have gone into the development of national standards and the widely held belief that these standards are being generally applied. In the field of traffic signals, it was explained, red, yellow, and green are the generally accepted directives to stop, exercise caution, or proceed. However, numerous variations in the use of these colors in different jurisdictions confuse motorists from other jurisdictions. In some localities, for example, red and yellow in combination require vehicle traffic to stop and direct pedestrians to proceed. In some areas right turns on a red signal are permitted. In other areas yellow is omitted entirely.

Center Line Markings May Confuse Motorists

The committee also reported that with respect to pavement markings the use of solid center lines in some states is confined to curves, hill crests, or other hazardous locations where overtaking and passing is prohibited. On the other hand in some other states solid center lines are used on straight sections , and no-passing zones are indicated by various types of marking such as the use of yellow, white, or both, and solid or broken lines, or both. Such contradictory marking indications may easily cause a motorist who is unfamiliar with a neighboring state's highway rulings to become confused and through misunderstanding of the warning intended cause a collision.

It was, therefore, recommended by the conference's committee handling the action program that all juris-

[1] A new edition of the American Standard Safety Code for Safety Glass for Glazing Motor Vehicles Operating on Land Highways (with Supplement, Z26.1a-1948), Z26.1-1938, is now being prepared by the sectional committee. This committee is sponsored by the National Bureau of Standards and the Accident Prevention Department of the Association of Casualty and Surety Companies.

dictions adopt the provisions governing traffic signs, signals, markings, and islands contained in the American Standard Manual on Uniform Traffic Control Devices for Streets and Highways, D6.1-1948.

Other standards were recommended to facilitate the adoption of a traffic safety program. For example, the technical committee on engineering suggested that the American Standard Practice for Street and Highway Lighting, D12.1-1947, be used as a guide in the necessary work of modernizing street lighting and lighting on hazardous sections of highways, particularly near the entrances to municipalities where there is considerable pedestrian traffic.

In stressing the importance of uniformity in state and local traffic laws the conference through its various committees strongly recommended that all states and municipalities adopt the standards of the Uniform Vehicle Code and the Model Traffic Ordinance. It also emphasized the need for the Federal Committee on Highway Safety, the State and Local Officials' National Highway Safety Committee, and the National Committee for Traffic Safety to cooperate to further the enactment of the code and ordinance.

The conference expressed the hope that state officials would not only adopt the recommended standards for their own state but also work with other states in establishing uniform traffic laws throughout the country.

Miner, Johnson Are New Officers Of Safety Code Correlating Committee

New officers and members of the Executive Committee of the Safety Code Correlating Committee were elected at the committee's meeting June 23:

Chairman: H. L. Miner, Manager, Safety and Fire Prevention Division, E. I. duPont de Nemours & Company, Inc. (representing the Manufacturing Chemists Association and the National Fire Protection Association)

Vice-Chairman: A. S. Johnson, Vice-President and Manager of the Engineering Department, American Mutual Liability Insurance Company, (representing the National Association of Mutual Casualty Companies)

Mr Miner has been active in safety work since he started his first job in 1904 as clerk to the Special Hazards Committee and assistant editor of the Quarterly of the National Fire Protection Association at Hartford. He has been with the duPont Company since 1915—as manager of the Fire Protection Division of the Engineering Department in 1916, manager of the Protection Division of the Service Department in 1919, and manager of the Safety Division and the Fire Protection Division in 1926. These two divisions were later merged to form the single safety and fire prevention division he now heads.

Mr Miner has long been a national figure in fire prevention and safety work. He has served as a member of the Board of Directors of the National Fire Protection Association for more than 25 years and has served as president for two years. He has been active in the work of the National Safety Council and has served as a member of the council's Board of Directors for many years. Recently he has taken an active part in the work of the technical committees developing the programs of the President's Conference for Industrial Safety.

H. L. Miner

A. S. Johnson

In addition to membership on several safety code committees under ASA procedure, Mr Miner has been a member of the SCCC for 13 years representing the Manufacturing Chemists Association and was vice-chairman in 1948.

Mr Johnson is a member of the Company Member Conference of the American Standards Association and has served on the Standards Council since 1946 and on the Board of Review since 1947. In addition he has taken an active part in the work of the ASA Sectional Committee on Specifications for Accident Prevention Signs, Z35, since 1948. He has represented the NAMCC on this committee.

Mr Johnson is also a member of the American Society of Safety Engineers and the American Public Health Association.

Members of the Executive Committee are:

W. F. Weber, Hazards Engineer, Western Electric Company (representing the ASA Telephone Group)

J. J. Bloomfield, Assistant Chief, Industrial Hygiene Division, U. S. Public Health Service (representing the Federal Security Public Health Service)

Myron Park Davis, Chief Chemist and Metallurgist, Otis Elevator Company (representing the American Society for Testing Materials)

J. A. Dickinson, Head Safety Codes Group, National Bureau of Standards (representing the National Bureau of Standards)

J. M. Roche, Manager, Industrial Department, National Safety Council (representing the National Safety Council)

Industrial Safety Is Being Studied

The request of the President's Conference on Industrial Safety for the expansion of work on industrial safety standards and for more effective ways of getting them into use was acted on by the ASA Safety Code Correlating Committee at its meeting June 23. The committee has delegated to its chairman the task of appointing a subcommittee to determine the need for more safety codes and the adequacy of existing codes. The chairman is also to appoint a subcommittee to determine the ways and means of promoting the use of American Standard safety codes.

The President's Conference on Industrial Safety, in which 16 members of the Safety Code Correlating Committee participated, also urged the development of procedures to put nationally recognized standards into effect in state laws and local ordinances in order to promote uniformity of technical requirements throughout the country. The development of such procedures is the work of the ASA Committee on Model Laws and Ordinances, Z56.

Taking up other phases of its work, the Safety Code Correlating Committee discussed the question of labor representation on the SCCC. It was suggested that unorganized as well as organized labor should be represented. A subcommittee is to be appointed to look into the problem and recommend sources of representation.

The Rayon Industry

New Sectional Committee on Rayon Finished Fabrics will develop performance requirements and test methods

MANUFACTURERS and processors of rayon fabrics and retailers who sell to the public have accepted a challenge to "demonstrate to the whole country that we are capable of self-regulation" and to "strengthen our position as free enterprisers in our relations with the government and public." This challenge was made by J. D. Runkle, vice-president and general manager of Crowley-Milner Company, Detroit, in his opening speech as chairman at the organization of a new Sectional Committee on Rayon Finished Fabrics. The committee, which held its organization meeting June 16 at the Waldorf-Astoria Hotel, New York, is sponsored by the National Retail Dry Goods Association under the procedure of the American Standards Association. Its membership includes users of rayon fabrics and over-the-counter finished products, technicians, and representatives of government departments, in addition to manufacturers and merchandisers. They accepted Mr. Runkle's challenge by setting up four subcommittees to start work immediately.

The committee expects to develop performance requirements and test methods for rayon fabrics for different uses that will give information making it possible for anyone to tell whether the rayon material she is buying is suitable for a dress, for a bathing suit, for upholstery materials, for a man's shorts, or a woman's evening gown. It is planned that this information will be made available to the public by means of a certification and labeling procedure.

As the basis for this work, the American Viscose Corporation has made available the results of its 19 years' research on standards of performance of rayon fabrics.

The four subcommittees named and the chairmen appointed are:

Women's Wear: H. G. Leef, Merchandise Manager, Woodward & Lothrop, Washington, D. C.

Men's Wear: Robert B. Coons, Merchandise Manager, Franklin Simon and Company, New York; director, Men's and Boy's Wear Group, NRDGA.

Home Furnishings: Henry Witte, Vice President, R. H. Macy & Co., Inc., New York; director, Home Furnishings Group, NRDGA.

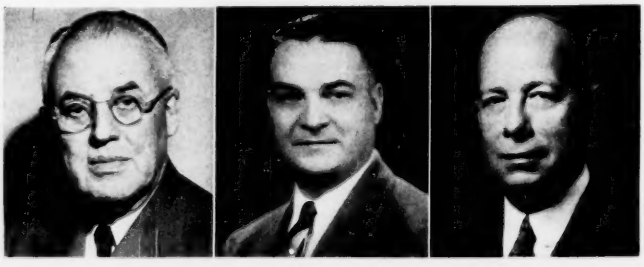
Administrative: Gordon K. Creighton, Assistant General Manager, NRDGA; Vice-Chairman, Sectional Committee on Rayon Finished Fabrics, L22.

All groups particularly concerned with the subject of one of the subcommittees will have an opportunity to take part in the technical work on a proposed subject.

The term "rayon" is to be understood by the committee to include those fibers that are derived from a cellulose base regardless of what process is used in their manufacture. The work itself will be: "The development of specifications, test methods, and performance requirements for rayon fabrics (containing more than 50 percent of rayon) used in the manufacture of such products as men's wear, women's wear, and home furnishings; and the development of uniform methods of collecting samples for compliance tests; and the establishment of methods of promoting the use of the specifications, test methods, and performance requirements for rayon fabrics through suitable certification and labeling procedures."

The organizations represented at the meeting were:

American Association of University Women
American Association of Textile Chemists and Colorists
American Council of Commercial Laboratories
American Home Economics Association
American Hospital Association
American Institute of Laundering
American Retail Federation
Association of Buying Offices Inc
Congress of Industrial Organizations
Cooperative League of the USA
Limited Price Variety Stores Association, Inc
Mail Order Association of America
National Association of Finishers of Textile Fabrics
National Consumer-Retailer Council Inc
National Federation of Textiles Inc
National Institute of Cleaning and Dyeing
National Retail Dry Goods Association
Rayon Yarn Producers Group
Silk and Rayon Printers and Dyers Association of America, Inc.
Textile Distributors Institute, Inc
Textile Fabrics Association
Underwear Institute
US Department of Agriculture—Bureau of Human Nutrition and Home Economics
US Department of Commerce—National Bureau of Standards
US Department of Labor—Bureau of Labor Statistics
US Department of the Navy—Bureau of Supplies and Accounts
US Department of the Navy—Marine Corps
United Textile Workers of America—American Federation of Labor



G. K. Creighton H. G. Leef Henry Witte

Accepts A Challenge

Rayon industry affirms its desire for self-regulation in establishing quality and informative labeling

By Jay D. Runkle

AS early as September 1948, the NRDGA Board of Directors asked the American Viscose Corporation if they would be willing to give to the public the results of their 19 years' research on standards of performance of rayon fabrics. Early this year the American Viscose Corporation advised the American Standards Association that it would make the material related to its plan available to the public through the American Standards Association. This material would be offered as the basis for developing national standards for fabrics. Furthermore, the Corporation extended its cooperation by stating that any additional material available in relation to this work would be made available to any committee which would be created for the development of standards and that it would assist the National Retail Dry Goods Association, as the sponsor, in carrying on its work in this field.

Broadly speaking, we have a choice of two roads ahead of us. The first one is through inaction, through a policy of "wait and see," until the government interferes and imposes on us rules and regulations. Unfortunately, too often the well-established way in such a case is to send representatives to Washington, lodge firm protests, explain in long briefs that no such legislation is either needed or desirable, but do nothing constructive to alleviate the conditions which caused the demand for government action.

Take, for instance, the pending bill sponsored by Mr Green on cotton labeling, and another bill for rayon fabrics. They deal with labeling and they are very similar to that already on the statute books for the woolen industry. I do not know the cost of administration of the Wool Labeling Act. I know only one thing, we have very remote control over such matters. In reference to the pending bills on labeling, some of the government agencies already have gone on record as favoring such legislation. On the other hand, such governmental officials as George Mason, Commissioner, Federal Trade Commission, has often made public statements discouraging the industry from coming to Washington to seek regulations.

What Do We Mean By "Informative Labeling"

Is the information required in these bills "informative labeling?" And, what do we mean by "informative labeling?" According to these bills we mean information as to this and that percentage of one or another fiber by weight content. What good does this type of information do the consumer? Does it enlighten her as to the way in which the articles should be maintained? Does it provide her with the information necessary to know whether this or that material is hand washable, launderable, or dry cleanable? Does it make it possible for the consuming public by and large to know that the fabrics do meet certain well-established minimum requirements? The answer is no.

We have as yet time to follow the second road, that of industrial self-government. No amount of public pronouncement or other form of publicity can sell the public on the advantages of self-regulation as well as can the industry's own performance.

In sponsoring this project on Rayon Finished Fabrics, and inviting your cooperation in its development, the National Retail Dry Goods Association aims to solve, at a sufficiently early stage, the problems for which the public need has been established and thereby prevent these problems from becoming a legislative football in Washington, D. C. If we succeed in our aim to establish quality control and informative labeling, we will demonstrate to the whole country that we are capable of self-regulation and will strengthen our position as free enterprisers in our relations with the government and public.

It is not this or that set of standard technical provisions that may be considered by this committee that is at stake. What is at stake and what is on trial is the ability of free enterprise to respond to the need of the buying public for informative labeling and minimum requirements for the rayon industry. The rayon industry, young and modern, is fully aware that the public demand is of paramount importance to its success and progress.

Industry Is Interested In Public Reaction

Since the very start of the rayon industry, it has always maintained its interest in what the public reaction would be toward its product. It has always carried extensive research into the field of public reaction to find better ways of satisfying the consumer. For many years, extensive research of this type has been carried on by the rayon interests through the National Retail Dry Goods Association.

May I digress a moment to say

Mr Runkle, *vice-president and general manager of the Crouley-Milner Company, is chairman of the ASA Committee on Rayon Finished Fabrics. This paper was presented at the committee organization meeting, June 16.*

that despite my remarks about too much legislation, I am very happy to greet the governmental representatives who are with us. The governmental agencies have much valuable information on many matters important to both business interests and to consumers. I hope that through those representing the government we may utilize this information in the development of our work. I believe we can all agree that the principle of free enterprise calls for cooperation of business with the government as well as with the public.

The gift of the American Viscose Corporation has cut short many preliminary steps which would have been inevitable if its research and findings had not been made available and it is not an overstatement to say that a great deal of goodwill will be earned not only by this corporation but by the whole rayon industry, including spinning, weaving, finishing, and converting if we can carry the work of this committee to a successive end.

I would like to make it amply clear that every trade has the right to be represented whenever its interest is directly affected. All any group has to do is to ask for representation when the item affecting it directly is discussed. We will try not to omit anyone who may be interested in participating in this important work.

Dr Price Honored for Service to Agriculture

On May 16 the Secretary of Agriculture, Charles F. Brannan, presented Dr David J. Price, Bureau of Agricultural and Industrial Chemistry and member of various ASA sectional committees, with a superior service award for his outstanding service to agriculture in the development of methods for the prevention of grain-dust explosions and the prevention of fires on the farms and the rural communities of the United States.

A report of this presentation was made by Ivor Fenton, Representative from Pennsylvania, in the House of Representatives on May 17. In speaking of Dr Price's contributions to the field of the development of safety measures, Mr Fenton said. ". . . He has made distinguished contributions in the chemical engineering field and is an internationally recognized authority on the prevention of dust explosions in industrial plants and in grain milling and processing operations.

"Dr Price served as president of the National Fire Protection Association from 1942 to 1944 and has rendered valuable assistance to the firemen of the nation in the development and application of safety measures for fire-fighting operations.

"The award to Dr Price by the Secretary of Agriculture is a well-deserved recognition of the splendid services rendered by one of the Department of Agriculture's distinguished research scientists."

For many years Dr Price has contributed his valuable services as a research scientist to the standards work under the procedure of the ASA. From 1929 to 1942 he was chairman of the National Fire Protection Association's Committee on Dust Explosions, which also operates under ASA procedure as the Sectional Committee on Safety Codes for the Prevention of Dust Explosions, Z12. He is a member of the ASA Sectional Committee on the Standardization of Methods of Recording and Compiling Accident Statistics, Z16, sponsored by the National Safety Council and the Accident Prevention Department of the Association of Casualty and Surety Companies.

Fifteen subcommittees have been set up by Sectional Committee Z12, and some of the safety codes developed by them are for the prevention of dust explosions in starch factories, flour and feed mills, woodworking plants, and in the manufacture of aluminum bronze powder.

Hylton R. Brown, Bureau of Mines of the U. S. Department of the Interior in Maryland, is now chairman of this sectional committee.

Internationally Speaking—

Aircraft (ISO/TC 20)—

Standards for ground-to-aircraft servicing connections sent to the ISO general secretariat by the American Standards Association are being studied by other member countries of the ISO.

Boilers, (ISO/TC 11, Test Pressures for the Acceptance of Stationary Boilers and Unification of Boiler Construction Codes)—

The Council of the American Society of Mechanical Engineers has endorsed the recommendations of the ASME Boiler Code Committee that the United States participation has been authorized to in this activity and accept the secretariat for this international project. The ASA has advised the ISO accordingly and the ASME Boiler Code Committee will take the leadership for American participation.

Fire Fighting Equipment (ISO/TC 21)

Manufacturers of fire-fighting equipment who may be exporting their products as well as other groups concerned with prevention of fire hazards are being consulted as to whether the United States should participate actively in this international work.

Paper (ISO/TC 6)—

A translation of the official report of meetings held by the committee in May 1948 have been sent to all who have asked to be kept informed of the activities of this committee.

Preferred Numbers (ISO/TC 19)—

The ASA Sectional Committee on Preferred Numbers Z17, as the representative American group in the field, has noted that the United States should take an active part in the international work on preferred numbers.

Pump Testing (ISO/TS/Pj)—

The question whether the American Standards Association should take part in an international project on behalf of United States industry has been referred to American groups that may be interested. The project is intended to cover "the determination of all requirements for the performance of pump tests." It is explained that the reason for proposing the project is that the extensive international trade in pumps now is based on specifications varying from country to country, so that the comparison of bids submitted by manufacturers from different countries is extremely difficult.

Welding (ISO/TC 44)—

Material received from the Swedish Standards Association as secretariat for this international project has been referred to the American Welding Society. The Society has asked that the ASA keep it informed as to what is going on in the international field.

For Inspection of Fine Pitch Gears

AGMA standard tests for fine pitch gears allow production line inspection

By Gerald Smithson

The development of AGMA Standards for the inspection of fine pitch gears came about through an insistent need for a simple, yet adequate means for determining before assembly whether or not a mechanism employing gears would function properly.

The direction in which this standardization developed was largely influenced by the demands placed upon gears by war equipment. Gears had to meet requirements which had virtually never before been imposed upon them. Due to extensive subcontracting, gears were frequently made in any of several different plants and brought together to a common point for assembly. Equipment was required in such large quantities and within such a short time, that no longer was it possible for the craftsman assembler to spend days adjusting bearings and center distances and selectively assembling gears to obtain the final fit. On the contrary, gears had to be assembled by unskilled help. They had to be assembled on a production line basis, and yet they had to meet the closest requirements ever demanded of gears. This called for a precise statement of tolerances, and a standard procedure for inspection. AGMA Standard 236.02 was developed to meet this need.

Gears are not like most other machined parts, which require only the simple determination of length or diameter. They are complex parts; they are parts which frequently rotate at considerable speed; and because of the dynamic nature of their use, an accurate relationship between a number of dimensions must be obtained in order for them to function properly.

The various errors with which we are concerned may be grouped as follows:

1. Tooth errors
2. Runout
3. Size errors
4. Surface finish

No AGMA Standards have as yet been established for surface finish. And since surface finish cannot be inspected by the same basic procedure used for tooth errors, runout, and size, it will be omitted from the subsequent discussion.

Tooth Errors. Tooth errors may be errors in tooth thickness, pitch or profile. In Figure 1, several gear teeth are shown which illustrate these dimensions.

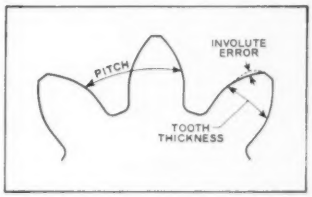


Fig. 1—Tooth Error

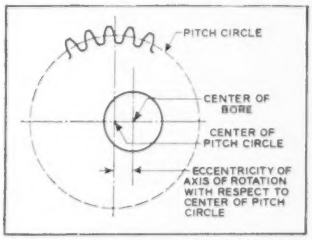

PITCH CIRCLE
CENTER OF BORE
CENTER OF PITCH CIRCLE
ECCENTRICITY OF AXIS OF ROTATION WITH RESPECT TO CENTER OF PITCH CIRCLE

Fig. 2—Runout Error

Runout Errors. Runout is a measure of the eccentricity of the gear teeth with respect to the axis of rotation. Runout is illustrated in Figure 2.

It is twice the eccentricity as shown there, since it is a measure of the total change in radius (from the axis of rotation to the pitch circle) in one revolution of the gear.

Size Errors. The size of a gear may be described in various ways. The word "size" is used here rather loosely to mean some measurement taken on the gear which will show whether the teeth at some arbitrary radius are thick or thin, and by means of which backlash may be controlled.

Size error should be distinguished from tooth thickness error, in that an error in tooth thickness which would be classed as a "tooth error" is an error which occurs in the thickness of one tooth as compared to the thickness of the teeth adjacent to it. When, however, all the teeth are either too thick or too thin, this constitutes an error in "size."

Tooth thickness can be measured with calipers. Profile error can be

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Mr. Smithson, Gear Engineer of the Watson-Flagg Machine Co., Inc., has served as a member of the Fine Pitch Committee of the American Gear Manufacturers' Association since 1943.

AGMA was formed in 1917 with one of its principal objectives "the standardization of design manufacture and application of gears. Inspection and tolerances for gears is only one of the many phases of AGMA's standardization program. Among these are such standards as gearing nomenclature, gear geometry, standards for computing allowable tooth loads and stresses in spiral and straight bevel gears, industrial application and formulas for computing rating of various gears and gear units.

Some of these have received approval as American Standards; for example, the American Standard Gear Tolerances and Inspection, B6.6-1946; and the American Standard for Involute Splines, Side Bearing, B5.15-1946.

The standard discussed in this paper was included for the first time as Section 10 in the November 1948 Index to Volume 2 of the AGMA Standards. Its full title is Fine-Pitch Gears—Inspections and Tolerances, 236.02. Copies can be obtained from the American Gear Manufacturers' Association, Empire Building, Pittsburgh 22, Pa. at $2.50 per copy.

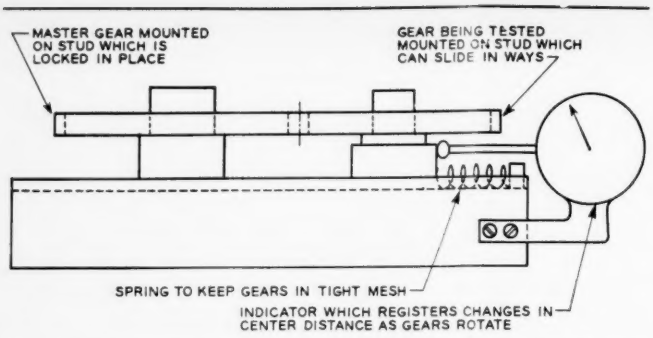

MASTER GEAR MOUNTED ON STUD WHICH IS LOCKED IN PLACE
GEAR BEING TESTED MOUNTED ON STUD WHICH CAN SLIDE IN WAYS
SPRING TO KEEP GEARS IN TIGHT MESH
INDICATOR WHICH REGISTERS CHANGES IN CENTER DISTANCE AS GEARS ROTATE

Fig. 3—Set-up for test method using master gear to check production gear.

measured by an involute checking machine or by comparing the shape with a template on a comparator, and so with all the other individual errors which may be present in a gear. A discussion of these individual errors, and methods for their inspection, is included in the Fine Pitch Standard (236.02) but they should be considered as supplementary to the spring-actuated variable center-distance method around which the Fine Pitch tolerances are built. When this latter method shows gears to have errors greater than can be permitted in service, more detailed methods of inspection are generally necessary in order to find the precise cause of the error and thus determine what corrective measures must be taken.

But by and large, these detailed methods were developed principally for coarse pitch gears and are not as readily applied to the inspection of fine pitch gears where the teeth are small and the quantities to be inspected generally large and where the cost per gear for inspection must be kept relatively small.

It was natural, therefore, for the Fine Pitch Committee to adopt the variable center-distance method of inspection as the basic method and build the tolerances around this system. The philosophy behind this is that the easiest, most practical, and useful way in which to determine whether or not a gear will function properly is to run it. It could be run with another nominally identical gear, or it could be run with its mating gear. If the gears are held in mesh by means of a spring pressure, tooth errors, runout, and size variations will all cause the center distance between the two gears to vary and from the characteristics of this varying center distance, the magnitude of the various errors can be determined. With two production gears running together, it would not be known, however, how much of any particular error was contributed by each gear, and this could be determined only by a rather laborious process of running the gears in various meshing positions. This difficulty can be overcome if the gear is checked with respect to a master gear. Hence, the establishment of AGMA Standard 235.01 covering "Master Gears." For the purpose of our present discussion, we may consider a master gear as a theoretically perfect gear. Fig. 3 shows the set-up for this method of inspection.

The gear is mounted on a fixed pin on which it can be rotated. Similarly, the master gear is mounted on a pin on which it can be rotated, the two gears being in the mesh. The pin on which the master gear is mounted is set in a block which is capable of sliding along ways in the direction of the center line between the two gears. A spring forces the two gears into mesh. As the gear on the fixed stud is rotated, errors in the teeth and runout will cause the center distance to change, and if these center distance changes are observed on an indicator suitably placed against the movable stud, a measure of the amount of these errors present in the gear is obtained. If the indicator is initially set on zero for some known center distance, the indicator reading will also show the extent to which the gear is either over-size or under-size. If, instead of an indicator, the varying center distance is recorded on a chart, a permanent record may be obtained. The small wiggles are due to the tooth errors and have been given the name "Tooth-to-Tooth Composite Error." The total change from high to low is called the "Total Composite Error."

This is really the combined effect of both tooth-to-tooth errors and runout.

If a recording device is used to register the changes in center distance, tooth errors and runout may be quite easily separated. But as a matter of fact, it is quite unnecessary to do this, since generally we are concerned with the total variation (including tooth errors) in 360 deg. Variations in size cause this entire curve to shift up or down.

Values for the Total Composite Error and Tooth-to-Tooth Composite Error are fixed for each class of gear, and are given in Table. 1.

Table 1—Standard Tolerances for Fine Pitch Gears

Class	Total Composite Error (In.)	Tooth-to-tooth Composite Error (In.)
Commercial 1 ...	0.006	0.002
Commercial 2 ...	0.004	0.0015
Commercial 3 ...	0.002	0.001
Precision 1	0.001	0.0004
Precision 2	0.0005	0.0003
Precision 3	0.00025	0.0002

Unlike total composite error and tooth-to-tooth composite error, size must be measured with respect to some reference center distance between the gear and the master. This reference center distance could be chosen quite arbitrarily provided the amounts the center distance could then change were properly determined. As a matter of convenience, however, the most suitable reference center distance to choose is one at which the gear (or pinion) would mesh with the master gear if no backlash were desired between the pinion and gear when they were operating on their proper center distance. Thus, any departure from this reference center distance can be interpreted directly in terms of backlash which has been cut into the gear. The amount the center distance may depart from this "zero" center distance may be specified by "*Maximum and Minimum Indicator Readings.*"

In Figure 4 are given some typical checking data together with several typical gear records which might be obtained. It will be noted that the difference between the maximum and minimum indicator readings has been made greater than the total composite error; that is, the "size" bracket includes tooth errors and runout in addition to actual size variations.

In the transmission of power, the primary consideration is the stress which the gear teeth must withstand. At high speeds, it is of the utmost importance to keep tooth errors to a minimum, since even small tooth errors will cause considerable noise and add enormously to the dynamic loads, with resultant high stress on the gear teeth. At low speeds, how-

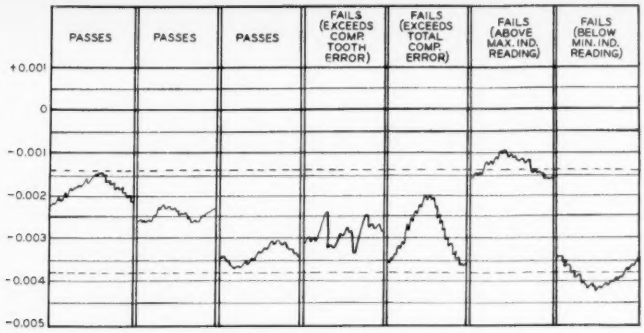


Fig. 4—Typical inspection data and gear charts for 32 pitch precision class 1-B gear. Set-up center distance with master gear is 2.8750; maximum composite tooth error, .0004; maximum indicator reading, —.0014; maximum total composite error, .0010; minimum indicator reading, —.0038.

ever, considerable error may be tolerated without appreciably affecting the strength of the gears.

Runout will not materially affect the stresses on the gear teeth, but will contribute a low-frequency wavering noise.

Size need not be held accurately just so long as the gears do not bind at any point. It is, in fact, advisable to put in a generous amount of backlash.

In the transmission of motion, the primary consideration is the accuracy with which angular rotation is obtained and the principal concern, therefore, is with those items which will affect this accuracy.

Tooth errors will contribute some error to angular motion but must be quite large before this error amounts to much. In ordinary gear cutting, they contribute little.

Runout will introduce considerable error.

Whether size must be closely controlled to obtain accurate transmission of angular motion depends upon whether or not the centers on which the gears are to run are adjustable and whether or not the direction of rotation is reversed. If the centers are adjustable, they can, of course, be made to compensate for variations in size. With fixed centers, however, gears which are undersize will have more backlash, resulting in a certain amount of lost motion when the direction of rotation is reversed.

For the transmission of power, Table 2 gives the class of gear directly in terms of pitch line velocity in feet per minute.

Table 2

Pitch line velocity feet per minute	Class of Gear
up to 80	Commercial Class 1 and 2
up to 400	Commercial Class 3
up to 2000	Precision Class 1
Over 2000	Precision Class 2 or 3

As stated earlier, for gears whose function is the transmission of power only, a certain amount of backlash is desirable. It is not important, therefore, to keep backlash within close limits, and the size of the gears may be allowed to vary considerably. This is not generally so with gears which must transmit accurate angular motion, for in most cases these gears are mounted on fixed centers and are subject to reversals of direction of rotation, in which case the gears must be held within close limits for size. Taking into account the effects of runout and tooth errors, in addition to variations in gear size and tolerances on the center distance, the values given in Table 4 are the *smallest variations* in backlash which may be called for in the case of each class of gear and which will not be exceeded if *all* the variables combine at one time to give a minimum amount of backlash and at *another* time to give a maximum amount of backlash. Larger variations in backlash may, of course, be called for. From the above, two points should be observed; first, that a change in the size of a gear is somewhat a matter of design as dictated by the function which the gear is to perform rather than an error such as tooth errors and runout, and second, allowable size variations are not necessarily fixed for each class of gear.

The proper class of gear for the transmission of motion can probably best be chosen from Table 3. For example, knowing the total angular error which may be permitted for a train of gears, the corresponding maximum allowable backlash at each mesh may be determined. The values in Table 3 may be taken as this maximum, with the minimum expected backlash then being zero. When gears are of a different material than their housing and are subject to wide temperature ranges, it may be necessary to establish the minimum assembly backlash at some value greater than zero to prevent binding of the gears under certain operating conditions.

How close the center distance can be held will depend in each case upon the design, and the quality of available manufacturing equipment and labor.

Table 3—Total Backlash Variations (Pair of Gears)

20° Pressure Angle

Class of Gear	Center Distance Adjustable	Center Distance Tolerance ± .0000	± .0003	± .0005	± .0008	± .0010	± .0013	± .0015	± .0020	± .0025
Commercial 1	.0087	.0130	.0134	.0137	.0142	.0145	.0149	.0152	.0159	.0166
Commercial 2	.0058	.0086	.0090	.0093	.0098	.0101	.0105	.0108	.0115	.0122
Commercial 3	.0029	.0044	.0048	.0051	.0056	.0059	.0063	.0066	.0073	.0080
Precision 1	.0015	.0023	.0027	.0030	.0035	.0038	.0042	.0045	.0052	.0059
Precision 2	.0007	.0010	.0014	.0017	.0022	.0025	.0029	.0032	.0039	.0046
Precision 3	.0004	.0006	.0010	.0013	.0018	.0021	.0025	.0028	.0035	.0042

An Investment for the Electrical Industry

Manufacturers and users of electrical components can enjoy the advantages of standardization—increased volume production, lower costs

By A. C. Monteith

STANDARDIZATION has been criticised by some, because the results have not been clearly evident. It is not easy to see the benefits of standardization at a time of rising labor and material costs. To see the benefits that we have achieved requires a comparison with some industry, such as the automotive business, where standardization has long been thoroughly practiced and therefore the major gains from it have been realized. Here we find the comparative results startling. Comparing 1943 with 1939 figures, automotive wages have risen 82 percent, materials 90 percent, and car prices 89 percent. In the electrical manufacturing industry, where standardization is just being felt, wages are up 90 percent, materials 76 percent, but prices are up only 33 percent. One concludes that electrical manufacturers have had a certain amount of standardization accompanied by volume to act as a brake on rising prices. A greater adherence to standards, especially in times of lower business levels, can bring fuller advantages to the industry by increasing volume and thereby reducing costs of electrical equipment.

Standards Are Aid To Volume Production

Volume production is essential. This is illustrated by the experience with a 1500 hp direct-current motor built during the war. Because the order called for over 300 machines, special jigs and tools were justified. These eliminated such operations as brush-rigging adjustment, interpole adjustments, individual seating of the brushes, and so on. In this way the cost was materially reduced below what it would have been if only two or three of these machines had been built on a single order. For heavy electrical equipment this is, of course, an extreme case of volume production, and in general it is not possible to do as well on commercial orders. It does, however, illustrate the possibilities.

There are many varieties of standardization, but at the moment we will concern ourselves with only two. One class embodies those standards which each manufacturer sets for himself so that he can achieve a reasonable measure of quantity production. For example, we have developed a family of handles that serve a variety of breakers, switches, and control elements. Likewise, we have a standard size and location of drain plugs, valves, etc. for oil-filled apparatus that enables us to stock standard parts, and to simplify drawings and manufacturing operations.

The other class under discussion, which we will call industry standards, comprises those which users and manufacturers in a given field develop cooperatively. Circuit breakers, distribution transformers, and steam generator units are in this category. These, if followed, are the most effective brand of standards, as both user and manufacturer have crystalized a common point of view.

Mr Monteith, who presented this paper at the 17th Annual Convention of the Edison Electric Institute, June 1, is vice-president in charge of engineering and research of the Westinghouse Electric Corporation. He knows the electrical industry well, having served with Westinghouse for 25 years. In 1924, he was assigned to the central engineering department of the East Pittsburgh Works, and in 1938 became manager of that department. Three years later he became head of the industry engineering department, and in 1945 became headquarters engineering manager. He was elected vice-president in 1948.

Manufacturer's Standards

Both classes of standards are important, and because of their money-saving qualities they merit your firm support. For example, consider the seemingly insignificant matter of the drain plug in a circuit breaker we cited a moment ago. "How," you say, "can a ten-cent plug have any real effect on the true cost of a $10,000 product?" Take the actual case of the drain plug on the tank of a 50,000 kva circuit breaker. In order to meet customer demands, we may have to provide a $\frac{1}{2}$, $\frac{3}{4}$, or 1 inch drain plug or drain valve, a special sampling valve or a special oil gage. In the past 15 weeks we have been required to manufacture this particular tank in eight different combinations of details. Under modern manufacturing methods we cannot use the "handmade" method of having someone take a new plug of different size—which we probably do not even stock—down to the shop and say to Joe, the workman, "Put this odd size plug there instead of where the drawings call for it." Manufacturing setups established to capitalize on volume require more formality. This detail change has to be handled through the order routine, and costs about as much as handling a new order. Drawings have to be changed, the new material purchased and, with appropriate instructions all in writing, Joe can then screw in the new plug. Cumbersome? Yes. But short-cut it and you get confusion.

The cost of this minor change may well total $100 to $200. "But," you say, "such a charge is exorbitant,"—

and besides you have never been asked to pay it. True. But it is there just the same and must be made up in the overall, aggregate cost level of the apparatus. A charge of this magnitude is seldom made directly. Perhaps it should be. It would make the economic loss of seemingly trifling deviations from standard more apparent. But accounting systems are not set up to do this—and if they were, that variation from standard would increase the cost even further.

The unit substation is an outstanding example of how the manufacturer can help reduce your system investment by combining all the elements for distribution substations into a few standardized, coordinated units. Increasing construction labor costs have greatly stimulated the use of unit substations. Much of the merit of the unit substation idea comes from the single responsibility, the integration of component design, overall manufacturing coordination, and factory testing possible when a single manufacturer does the whole job. Conversely, the unit substation principle loses much of its benefit if an attempt is made to replace some elements of a manufacturer's standard unit substation with elements of some other make. Some distribution-system engineers may wish to do this, thinking to combine the best features of different manufacturers. This clearly defeats the unit substation idea and must be resolutely avoided, as the losses far outweigh the gains.

Industry Standards

General features of unit substations need to be standardized from both the user's and the manufacturer's point of view. Actually, every major user has a standard of his own. This was to be expected in the initial mushroom-like growth of this new approach to the substation problem, but now sufficient experience is available to standardize. However, let us not standardize on everything and thus get no production volume benefit. Let's select one or two of the ways of killing this cat and discard the others instead of trying all nine ways. Useful suggestions in this regard appeared in the February and March issue of the EEI Bulletin this year. E. B. Shew states that 16 distribution substation layouts which he examined could, in his opinion, with a little concession and compromise, have been reduced to three. Our own observation confirms this. In the second article, W. M. Hanna shows how a variety of assemblies to suit different operating conditions can be made up of standard components.

We believe that the utilities could help themselves materially by adopting standardized substation bus and connection arrangements, such as are discussed in Mr. Shew's article, as well as standard operating procedure in such matters as grounding, testing, phasing of cable circuits, and the testing of relays. At the present time the practice on these items is completely nonuniform with operating companies, and this handicaps the manufacturers in developing devices which will suit even a small percentage of the users. We know of one company that has three different testing and grounding methods of its own and two methods of testing relays. Another item on which not too much standardization work has been done is outdoor substations built of structural steel members.

Heavy Machinery Too Can Be Standardized

An outstanding example of a general industry standard more fully developed is that of steam turbine generator units, which was approached with skepticism in many quarters. Here the steam pressure temperatures, bleed points, and kilowatt ratings of all turbine generator units from 11,500 to 60,000 kw have been standardized. Already, acceptance has been excellent. Over half of all machines falling within these boundaries on order are standard—proving that if anything so difficult can be brought into the standardization fold, in no field of heavy apparatus is standardization hopeless.

Turbine generator standardization, furthermore, well illustrates the several merits of standardization generally. These can be enumerated as follows:

1. Both users and manufacturers have been able to plan ahead. This is of special importance when engineering and drafting talent are in short supply. Drawings can be had soon after purchase. In the case of a second installation, the user frequently needs to modify only the foundation and building drawings in minor ways to suit a new location.
2. Machines are more reliable because they have been "debugged" in actual service. Regardless of the experience of the builder, the first one of a kind always requires some minor changes or adjustments on the site. Service experience is required to shake down a new model of any machine, whether it be an airplane or a turbine.
3. Delivery schedules are less likely to be interrupted when there is a flow of critical items coming through. A defective forging discovered during machining operations can be replaced by the next one in the flow line, etc.
4. Repair parts can be obtained more quickly.
5. Workmen in the factory improve in proficiency as their work is repeated.
6. Experienced design engineers—and their number is limited—can devote their time to creating and developing the new machine that will be the next improvement within the standardization framework.

The experience with turbine generators also demonstrates that standardization does not freeze development. Each manufacturer, in fact, has more time to improve blade materials and construction, to develop better steam flows, or any of the thousand and one ways by which he tries to make his standard machine better than his competitor's standard machine.

Steam turbine generator units, although conspicuous, are by no means alone in the field of power apparatus standardization. Good work has been done on distribution transformers where we have much the same situation as with turbines. Technical standards approved by the American Standards Association were brought up to date in 1948 with the acceptance of the EEI-NEMA Joint Report. It is true that there are far too many different standard arrangements included, both electrical and mechanical, but if these standards are used, a substantial industry gain will result. Every effort toward further simplification should be made.

Adherence to Program Is Essential Factor

And this brings to mind one essential fact. A standardization program—for all the effort and expense poured into it—is no better than the actual adherence it receives. Many utilities have not as yet agreed to follow these well-worked-out transformer standards in their own procurement. Frequently, this has been due to some individual who is not taking the broad-gage viewpoint that his own executives had in mind when they authorized the expense of the committee work.

Well under way is similar standardization on power transformers 501-10,000 kva, 3 phase, or 501 to 5000 kva, single phase up to and including 69,000 volts.

An example of cooperative standardization and of the progress that can be made if the utilities and manufacturers set their collective minds to it is the work done in the preferred ratings of power circuit breakers. The new American Standard C37.6-1949 published this year shows a reduction in the number of ratings of circuit breakers from 121 in the 1945 list to 82 in the new list. This has not been an arbitrary re-

duction but is based on actual usage during the five-year period. We are hopeful that in the course of time even this figure can be further reduced.

We must never forget that your customers who push buttons and like to live electrically do not care how you get electricity to their homes as long as you do it economically. Individualistic changes in design back in the system somewhere mean nothing to them.

Standards to last for a reasonable length of time and be accepted must be based on sound engineering and not be purely arbitrary or commercial. In adopting a standard, good judgment must be used so that the standard can be maintained for a long enough time to amortize the tooling for volume production. During this period, improvements are accumulated and put into effect at the next step in standardization effort instead of being adopted piecemeal.

The cases cited show that those who have planned the codes of standards have given us a good beginning. The extension of standardization into fields not now covered—and there are several of these—should proceed in an orderly way. The great crying need today is not to rush forward into an accelerated program of creating new standards, but to accept in fact, not just in theory, the standards already on the books.

When we have definitely returned to a buyer's market it is difficult for an engineer to resist the urge to bargain for something special, something not quite standard, in order to achieve some local need, fancied or real. It is even more difficult for the manufacturer, in periods of low business activity, to resist that request because not only does he need the business but also he does not wish to jeopardize the overall and perhaps sizeable order. The customer engineer by winning from the manufacturer an agreement to something beyond the standard, may indeed take pride in this horse-trading, feeling he has achieved some gain for his company by so doing. Nothing is farther from the truth. The inescapable result is an increase in costs. They may be hidden costs, impossible to totalize, but they are none the less real. They inevitably must be taken into account and play a part in establishing cost levels all out of proportion to their transitory worth. In this respect, manufacturers are at your mercy. You users companies, who are anxious to keep investment costs down, must not only encourage the establishment of standards but also you must insist that your people abide by them. You, the final users, pay for every successful attempt to sabotage either a manufacturer or an industry standard.

A Guide for Use of Pool-Cathode Mercury-Arc Power Converters

By C. H. Willis

THE new American Standard for Pool-Cathode Mercury-Arc Power Converters, ASA C34.1-1949, will be of outstanding value to those dealing with rectifiers and other electronic equipment used for power conversion purposes. It will serve both as a source of information and as a guide to terminology, circuits, test methods, and usual operating practices and conditions. The American Standard, sponsored by the American Institute of Electrical Engineers and recently approved by the American Standards Association, replaces the AIEE Number Six Report on Standards for Acceptance Tests for Metal Tank Mercury-Arc Rectifiers, dated 1934.

The new publication is divided into five parts covering: I Definitions; II Standards; III Test Code; IV Recommended Practice and Operating Guide; and V Rectifier Transformers.

The section on definitions gives precise meaning to a number of terms, many of which have come into use in the industry since 1934. Much of this new terminology arises from the use of phase control for varying the ratio of the d-c to a-c voltage and from the application of rectifiers for power inversion. Among the more important of the new terms defined are ignitron, excitron, rectifying device, single-way rectifier, double-way rectifier, commutating group, light transition load, initial inverse voltage, commutating reactance factor, arc-back, arc-thru, basic a-c voltage, ceiling d-c voltage, and d-c winding of a rectifier transformer. The names for a number of rectifier circuits have also been standardized, including diametric, wye, cross, star, and aster circuits as well as zig-zag and forked variations of these circuits.

***Mr Willis** is chairman of the Committee on Electronics of the American Institute of Electrical Engineers, and chairman of the ASA Sectional Committee C34, on Mercury-Arc Rectifiers.*

Section III on Test Code outlines the method of measuring many quantities such as arc-drop loss, regulation, and efficiency.

A reference is included to a report on "Inductive Coordination Aspects of Rectifier Installations," (*AIEE Transactions*, vol 65, p 419, 1946), which was inspired by the work of the committee that developed the new standard. The report gives a very simple and useful treatment of inductive coordination as it relates to the a-c side of electronic power converters.

The fifth section, which is also included in the American Standards for Transformers, Regulators, and Reactors, C57, contains all material relating to rectifier transformers and reactors.

Copies of the American Standard for Pool-Cathode Mercury-Arc Power Converters, C34.1-1949, can be obtained from the American Institute of Electrical Engineers, publisher, or from the American Standards Association at $1.20 each.

How Contractors' National Group Aids Construction

TOWARD the end of the war, in the summer of 1945, the builders and contractors of America were faced with the enormous task of catching up with the backlog of construction that had accumulated during the war years. The sharp rise during the past few years in the membership of the Associated General Contractors of America, Inc, the one nation-wide trade association of general contractors, is directly related to this increase in construction work. By June 1949, there were more than 5,200 member firms in the national association and its 108 affiliated chapters and branches throughout the United States and Alaska.

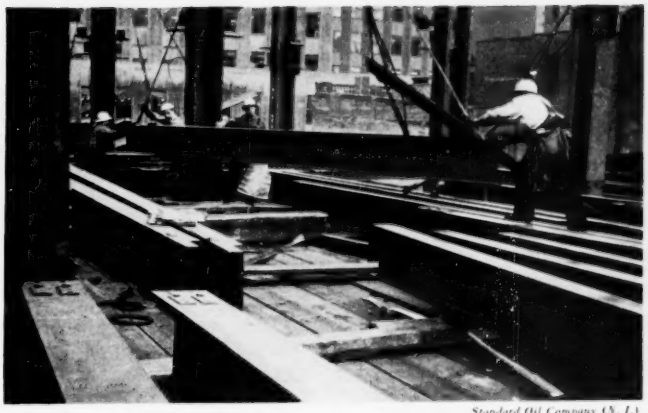
The interest of the AGC in the American Standards Association has been marked and has continued over a long period. Before it became a Member-Body early this year, some of its members had worked in various ASA committees on projects such as: Model Laws and Ordinances, Z56; Specifications for the Installation of Oxychloride Cement Flooring, A38; and the Safety Color Code, Z35. Members have also worked in the Building Code Correlating Committee and are serving on the Safety Code Correlating Committee.

Interest is Active In Safety Field

The association has been active in the field of safety. Studies in safe practice in construction are made by the AGC's Department of Research, which also conducts the accident prevention contests for member firms. The association cooperates closely with the Construction Section of the National Safety Council, and a number of its members are on the section's Executive Committee.

The Accident Prevention Committee has just published an entirely new edition of its book, *Manual of Accident Prevention in the Construction Industry*.

To carry out its program for increasing efficiency in construction, the AGC early in its career established the Cooperative Construction Bureau,



Standard Oil Company (N. J.)

"Hooker-on" shifts beams in construction of Rockefeller Center building. Most large-scale construction is handled through building contractors.

with which are affiliated the Mixer Manufacturers Bureau and the Contractors Pump Bureau. These bureaus have standardized the sizes and capacities of concrete mixers, pavers, and pumps used by contractors.

The Endorsements Committee of the AGC investigates and reports to association requests of outside agencies for approval or endorsement of policies, activities, simplified practices, products, commercial standards, or related matters. This committee also studies Commercial Standards for construction materials, which are prepared under the auspices of the National Bureau of Standards.

Specifications and standard contract documents are constantly being studied by the AGC and many organizations with which it cooperates. National Joint Cooperative Committees are maintained by the AGC with:

American Institute of Architects
American Society of Civil Engineers
American Association of State Highway Officials
Associated Equipment Distributors
National Association of State Aviation Officials.

In the near future, a Joint Cooperative Committee will probably be established with the Construction Industries Association, which is composed of manufacturers of construction machinery and materials.

In addition, the association has committees with—or is otherwise studying contracts and specifications with—such federal agencies as the Corps of Engineers, U. S. Army; Bureau of Yards and Docks, U. S. Navy; Bureau of Reclamation, Department of Interior; Public Roads Administration; Federal Works Agency; and the Treasury Department.

As samples of this work, the specifications improved by joint study by highway contractors and state highway officials are encouraging mechanized operations—resulting in reduced costs. Costs have been lowered in placing concrete by use of improved specifications.

To eliminate misunderstandings—which could lead to unexpected costs for owners—standards have been established for obtaining bids and awarding contracts for privately financed building. These are included in the booklet, *A Suggested Guide to Bidding Procedure*, pre-

pared and published by the AGC and the American Institute of Architects.

The information on national developments in construction, gathered by the national association, is constantly supplied to the chapters and branches throughout the country for use in handling local problems. In turn, the chapters and branches and directors provide the national association with local information—which gives a complete picture of conditions throughout the nation. This enables the association to take actions based on the combined experience of contractors of the country.

National headquarters of the AGC, of which H. E. Foreman is Managing Director, are maintained in the Munsey Building, Washington, D. C. President is Adolph Teichert, Jr, Sacramento, Calif; vice-president is Walter L. Couse, Detroit; secretary-treasurer is William Muirhead, Durham, N. C.

Letter Symbols Available For Gear Engineering

A new edition of the American Standard Letter Symbols for Gear Engineering for use in those mathematical equations and formulas that deal with toothed gearing has just been completed. Prepared by the Sectional Committee on Standardization of Gears, B6, sponsored by the American Gear Manufacturers Association and the American Society of Mechanical Engineers, the standard closely follows the general principles laid down by the Sectional Committee on Letter Symbols and Abbreviations for Science and Engineering, Z10.

A letter symbol is a single letter representing a numerical value in equations and formulas. In the field of gear engineering, such equations and corresponding calculations may deal with the design, application, manufacture, inspection, formulation of new methods, and solution of problems. The principal use of letter symbols is in mathematical work in published articles, papers, and books. They are not intended or recommended for use on working drawings, manufacturing records, or in correspondence where abbreviations, which are merely shortened forms of words, would be of greater value.

Since 1926 the American Gear Manufacturers Association has had a recommended practice for general gear nomenclature, including letter symbols, but it was not until the October 1941 meeting of the Association that definite steps were taken by the Committee on Nomenclature which led to the formulation of a proposed American Standard for letter symbols for use in gear engineering. The first edition of the American Standard was issued in 1943. The 1949 edition has been issued to correct a few errors in symbols and to add some recommendations concerning typography.

The system of symbols and subscripts given in this new edition is not restricted to existing gear terms and relationships but can be extended to cover new problems and new investigations.

In general, the standard explains, it is desirable to use a letter symbol without a subscript, using upper-case symbols for values applying to the gear and lower-case symbols for values applying to the pinion. A subscript appearing immediately after and somewhat below the general symbols is used to indicate a value applying to a particular gear or tool, or a value taken at a particular position or in a particular direction. A general plan for allocating subscripts is given in the standard.

In a few cases, the same letter appears as the symbol for two different terms, and some of the symbols may conflict with symbols used in other fields. Whenever the two terms or meanings appear in the same equation it is recommended that subscripts be used to avoid confusion. In any event, it is recommended that the terms for which symbols are used should always be clearly defined and a table of notation given, or reference made to the standard source from which the symbols are taken.

Authors preparing manuscripts dealing with gears are referred to other lists of American Standard letter symbols, particularly that for Mechanics of Solid Bodies, Z10.3-1942, and to the Recommended Practice of the American Gear Manufacturers Association on Gearing Nomenclature.

The American Standard Letter Symbols for Gear Engineering, B6.5-1949, can be obtained from the American Society of Mechanical Engineers, the sponsor organization that published it, or from the American Standards Association. Copies are 30 cents each.

Karl T. Compton Will Speak At ASA Annual Meeting

An address by Karl T. Compton, chairman, Massachusetts Institute of Technology, and chairman, Research and Development Board of the National Military Establishment, will climax the four-day series of conferences at the Thirty-First Annual Meeting of the American Standards Association October 11-14. Dr Compton will speak at the Annual Meeting Luncheon Friday October 14. The meeting is to be at the Waldorf-Astoria Hotel in New York.

Meetings of sectional committees and correlating committees will open this Thirty-first Annual Meeting on Tuesday, October 11. The Company Member Conference will convene on Wednesday October 12, and the Conference of Executives of Organization Members of the ASA will meet Thursday morning October 13. Tentative plans for Thursday afternoon have been made to hear reports on international developments in standardization by representatives of the American delegation who attended the summer meetings of the International Organization for Standardization in Paris. In the evening the Board of Directors will meet, and the Standards Council will go into session on Friday morning October 14.

Following the Annual Meeting Luncheon Friday, Octobeer 14, the Board of Directors and the Standards Council will meet together. This meeting will be open to ASA Members and all are urged to attend to hear firsthand the report of accomplishments and plans for the future and to participate in the discussions.

(A detailed agenda and time schedule of all meetings will be mailed to ASA Members in September.)

Standards Council Considers Various Topics

Hears how a standard works for industry

AN unusual feature at its June 16 meeting lifted the Standards Council out of the customary routine of committee reports, standards approvals, and standardization procedures. Council members were shown why the work they had done on a recently approved American Standard is of value to the industry and how the industry and user groups are benefiting from the use of it.

In the first of what is planned as a series of discussions on the use of American Standards, John H. Miller, Weston Electric Instrument Company, described the historical background of the new American Standard for Electrical Indicating Instruments, C39.1-1949.[1] By means of colored slides, he showed how these instruments have changed since the first of the general type now being made was produced in 1915. In addition to the slides, he used a panel of nine instruments to show how differences in the basic speed of the mechanism and in the amount of damping applied to it affect its action. These are the characteristics that are basic in the performance of this type of instrument, for which definitions have now been provided. The instruments shown were normal, very fast, and very slow, and one instrument in each of the three speeds were respectively undamped, critically damped, and heavily overdamped. An instrument that is completely undamped takes a long time to come to rest, as Mr Miller showed on the instrument panel. Heavily overdamping the instrument restricts the indications to the average of a rapidly changing phenomenon. An ordinary instrument of panel size will normally have a natural period of around ½ a second but this can be modified at some expense of applied energy to as low as 1/10 of a second and as high as several seconds.

Explaining to the Standards Council how the new American Standard C39.1-1949 is benefitting both manufacturers and users of electrical indicating instruments, Mr Miller said:

"We have reduced the varieties to be manufactured, we have stated in a more definite manner the performance characteristics to be expected, and designs have been upgraded to the point where a better product will inevitably result."

(For a more extended abstract from Mr Miller's statement, see page 217.)

[1] An article by Mr Miller on this standard was published in the April issue of STANDARDIZATION.

Discusses what is "Substantial Interest"

One of the most important subjects discussed at the meeting centered around the meaning of the term "substantial interest." This is the key to the entire ASA procedure. The first paragraph of the official Procedure of the Association reads: "A national standard implies a consensus of those substantially concerned with its scope and provisions." In carrying out the procedure, sponsor organizations and the ASA staff sometimes find it difficult to decide whether a group actually has a "substantial interest." Nowhere in the official documents is there a definition of what this term means or by what gage it is to be measured.

Recently the question came to a head when the Committee on Procedure recommended that the American Standards Association speed approval of Existing Standards and called attention to the fact that the lack of a definite criterion for interpreting the term is "a major block to rapid and expeditious action by the committees and staff who must, of necessity, make decisions in the matter."

"Existing Standards" are those standards that have been developed by some national association or technical society under its own procedure and have become so well established that they have been recommended for approval as American Standards. Before any Existing Standard can be approved, the association which originally developed it must submit exhibits showing that it has been accepted "by those substantially concerned with its scope and provisions." As one step to determine whether some definition of the term "substantial interest" could be agreed on to cut down the time spent in making this decision, the Council asked the Committee on Procedure to study the term, as well as its interpretation and the connotations associated with it.

At the June 16 meeting, the committee reported its findings. In the committee's opinion, no definite yardstick can be established. The determination of what constitutes a substantial interest is a matter of judgment, it declared.

"It is the committee's conclusion," T. E. Veltfort, chairman, reported, "that the application of those portions of the ASA Constitution, By-Laws, and Procedure containing the words 'substantially concerned' or 'substantially interested' depend primarily, for their proper application, upon the sound judgment of the sponsors and correlating committees involved. The committee is inclined to believe that a careful selection of the original personnel of sectional committees, frequent and well distributed publicity as to their work, and judicious consideration of requests for membership on such committees will all combine to make for a proper application of the requirements pertaining to those who may have a 'substantial interest.'"

Representatives of some of the sponsor organizations urged that

more specific responsibility be assigned so they can have a more dependable guide upon which to rely. One suggestion was that the sectional committee itself be given this responsibility. Another was that it be assigned to the sponsor.

Discussion of these proposals brought out the fact that there already is a well defined responsibility and line of procedure. As provided in the official Procedure of the American Standards Association, any organized group having substantial concern with the subject of a standard has an inherent right to be represented on the committee that develops the standard. It does not necessarily have to exercise that right, however. The committee itself, or other group that develops a standard, is made up of representatives accredited by these various organized groups. The committee is organized through cooperation between the group that has accepted responsibility for the administration of the work (the administrative sponsor) and the American Standards Association. The personnel of any committee must be approved by the Association, which means that after a sponsor has made up the list of members it is sent to the ASA correlating committee in charge of the work in that general field. The correlating committee reviews the list of proposed members and determines whether all are substantially concerned. It also decides whether there are any other organizations that are not on the list that may be substantially concerned and substantially interested. The responsibility is shared by the sponsor, who organizes the committee in cooperation with the ASA and by the ASA itself, which furnishes the sponsor with ideas for rounding out the membership of the committee.

When a specific question arises as to whether all groups with a substantial interest have had an opportunity to serve as members of a standardization committee, this question can first be referred to the correlating committee. If the correlating committee cannot decide the question or if there is disagreement with the decision, it can be taken to the Committee on Procedure for a final ruling, subject to review by the Standards Council.

The report of the Committee on Procedure, with its ruling that the definition of "substantial interest" cannot be decided arbitrarily but must be a matter of judgment, was accepted by the Council.

Reviews procedure for participation in ISO

The Committee on Procedure also reviewed the way in which proposals for American participation in the work of technical committees of the International Organization for Standardization are handled. Five steps are taken in carrying out the procedure at present.

First, when the ISO notifies the ASA that it has received a suggestion for international standardization work from some ISO member, the ASA sends the notice to Member-Bodies, Standards Council members, and alternates.

Second, any sectional committee working on the subject of the proposed international project is asked for recommendations as to whether the proposed project is desirable and whether the United States should participate. This is done through the sponsor. When there is no sectional committee, these questions are referred to those organizations especially concerned.

Third, the recommendations of the sectional committee and its sponsors—or the groups concerned—are referred to the appropriate correlating committee or to the Board of Examination to determine whether a consensus has been reached.

Fourth, the recommendation of the correlating committee or the Board of Examination is presented to the Standards Council (if a meeting is to be held very soon); otherwise it is presented to the chairman of the Standards Council for final action.

Fifth, the ASA staff informs the general secretary of the ISO as to the final decision.

It had been suggested that action could be taken more quickly if the fourth step were eliminated and the decision of the correlating committees were considered final. However, the Committee on Procedure decided that the decision to participate or not to participate is sufficiently important to American industry to warrant formal action by ASA, particularly since participation may place an added administrative burden on the ASA staff and add to ASA expenses. For this reason it recommended that when a correlating committee decides that the ASA is to take part in ISO technical activities this decision is to be ratified by the Standards Council if a Council meeting will be held within two weeks of the receipt of the recommendation. If the Council meeting is not to be held until later, such decisions will be ratified by action of the chairman of the Standards Council in consultation with the secretary of the ASA. This action is to be reported to the Council. In either case, the ASA secretary will advise the Council or its chairman how the ASA administrative situation will be affected by the proposed participation in this international work.

Considers interim revisions of standards

How to keep American Standards and codes of practice up to date most effectively was another question before the Committee on Procedure. In some cases revisions of parts of a standard are completed long before the entire revision can be agreed on. In order to provide up to date information for immediate use by those who are putting the code into effect it had been suggested that some special treatment might be given such interim revisions. However, the Committee on Procedure reported that in its opinion if interim revisions were treated in any different manner than a complete revision, it would lead to dilatory action on the part of committees through which they would continue to do the job of revision piecemeal, and thus complicate the application of the standard in practice. Any interim revisions, however extensive, should be duly processed through the regular ASA procedure and authenticated by ASA as an approved amendment to an existing American Standard, in the committee's opinion. The Council did not reach a decision on this matter. The Committee on Procedure will study the question further.

Hears of possible organizational changes

In addition to reports of the various committees, the meeting heard F. R. Lack report on the findings of the joint committee of the Board of Directors and Standards Council which has been studying possible changes in the titles of the ASA staff. Mr Lack, past-president of the ASA, is chairman of the committee. Because the title "secretary" does not adequately describe the duties and responsibilities of the head of the staff, Mr Lack explained, the committee is recommending to the Standards Council and Board of Directors that action be taken to change the title to "Managing Director." Amendments to the Constitution and By-Laws to put this change into effect are being submitted to the Standards Council, the Board of Directors, and the Member-Bodies for letter-ballot vote.

The Board of Examination, which is responsible for miscellaneous projects not under the jurisdiction of a correlating committee in any specific field, reported on progress in organizing a new General Correlating Committee to take its place. It is planning to place some of its projects under correlating committees now in existence and may make recommendations for organization of new correlating committees.

Standards Council members have several distinct functions, Vice Admiral G. F. Hussey, Jr, secretary of ASA told the Council. These include presenting the views of their organizations at Council meetings and reporting back to their organizations what goes on in the American Standards Association, what it is, why it is, and why their organization has an interest in it. As members of the Council they are responsible for voting on approval of a standard whether their organization is interested in it or not, he said. Just as a senator from the State of Maine is called on to vote on many questions remote from the interests of his state, so a member of Standards Council representing an industrial association may be called on to vote on standards of importance to another association but of little or no interest to the organization he represents. The Council members are not asked to vote on whether the standard is technically satisfactory. They are asked to decide whether all of the steps in the ASA procedure have been carried out properly, and whether the standard has attained a sufficient degree of acceptance to qualify as an American Standard.

Votes to take action on new project

As a result of recommendations from the Company Member Conference, the Council voted that action should be taken to provide a standard nomenclature for metal end products. The Conference recommendation for either initiation of a project or assignment to some technical committee proposed defining metal end products in terms of dimensions rather than process or any other basis. It was intended to cover wrought metal bar, strip, sheet and plate, and made a definite proposal to consider this definition.

Thickness (In.)	Width (In.)	Classification
0.250 and over	Up to 6, incl	
Over 0.250	Over 6	Plate
0.249 and under	Up to 6, incl	Strip
0.249 and under	Over 6	Sheet

The Conference also proposed that definitions or nomenclature be developed for metal end products to cover wire, rod, pipe, tube, tubing, hose, etc.

The recommendations were referred to the Mechanical Standards Committee to decide what action should be taken on setting up this project.

• • • How an American Standard Benefits Industry • • •

(Quoted from Mr Miller's talk before the Standards Council)

"LARGE organizations of users have seen fit, in many instances, to tabulate on their own blueprints the data incorporated in the specification [C39.1-1949] for the information of their own people, including both the engineering and the purchasing groups. Again, we have a reduction in varieties of requirements and a somewhat simpler method of doing business as compared with the days when every individual manufacturer felt impelled to write his own individual specifications.

"During the committee meetings themselves it was most interesting to see the impact of one engineering viewpoint on another. Some of us were embarrassed by product deficiencies, but if agreement was reached as to the general validity of any requirement, those who were embarrassed thereby usually took the viewpoint that the deficiency could and would be corrected. Such upgrading cannot help but benefit all concerned. In these meetings we had with us some engineers from public utilities and they have claimed that they obtained a liberal education in the subject of electrical measurements. Their viewpoints were accepted as of considerable importance and in several instances they reported deficiencies in performance. A study of the situation seemed to indicate that requirements could be added to eliminate or reduce those deficiencies by an agreeable compromise and these requirements were written into the specification.

"While we now have a rather specific series of standard sizes with definite characteristics and a preferred series of ranges, no one feels that this is limiting to the art since the trade still requires many instruments with special characteristics. However, experience indicates that most of these will be made within the overall dimensional limits of the specification, and, indeed, many orders for these off standard instruments call for Specification C39.1 where applicable.

"Summarizing this activity, and referring again to the value of the standard to users and manufacturers, we cannot help but feel that we have reduced the varieties to be manufactured, we have stated in more definite manner the performance characteristics to be expected, and designs have been up-graded to the point where a better product will inevitably result."

Standards from Other Countries

MEMBERS of the American Standards Association may borrow from the ASA Library copies of any of the following standards recently received from other countries. Orders may also be sent to the country of origin through the ASA office. The titles of the standards are given here in English, but the documents themselves are in the language of the country from which they were received.

For the convenience of our readers, the standards are listed under their general UDC classifications.

001.4;669.04 Metallurgical Thermal Processes. Terminology

Mexico

Heat Treatment of Steel. Definition. Terminology, DGN B32-1948

53.081 Physics and Mechanics. Units

Chile

Fundamental Units, INDITECNOR 2.4-6
Formation of Derived Units, INDITECNOR 2.4-7

531.7 Measurement of Geometrical and Mechanical Magnitudes

Chile

Units of Length, Area, Volume and Capacity, INDITECNOR 2.4-11
Density and Specific Gravity, INDITECNOR 2.4-12
Units of Force and Pressure, INDITECNOR 2.4-13
Units of Energy and Power, INDITECNOR 2.4-14

536.5 Temperature Measurement

Chile

Standard Temperature, INDITECNOR 2.4-1
Standard Temperature Scale, INDITECNOR 2.4-8
Reference Temperatures, INDITECNOR 2.4-9
Temperature Conversion Table, INDITECNOR 2.4-10

Finland

Conversion Tables: Centigrade Into Fahrenheit and Vice Versa, A.I. 31

55 Geology. Meteorology

Chile

Intensity Scale for Seismic Phenomena

Union of Soviet Socialist Republics

Psychrometrical Shed, GOST 4189-48

614.8 Prevention of Accidents. Safety Measures

The Netherlands

Firefighting Equipment. Single Ladder, N 1459
Firefighting Equipment. Extension Ladder, N 1461
Firefighting Equipment, Two-Parts Extension Ladder, N 1462
Firefighting Equipment. Folding Ladder, N 1463
Firefighting Equipment. Coupling for Underground Hydrant, N 557 (Revised)

United Kingdom

Equipment for Eye and Face Protection During Welding, BS 1542-1949
Code of Practice for the Protection of Eyes, SABS 014-1948

621.1/.6 Railways and Tramways

France

Bracket for Signals, French Type, NF F14-001
Various Kinds of Spring Suspensions, NF F01-046 through 051
38 mm Spanner With Insulated Handle, NF F76-015

Germany

Tie Plates, DIN 5915, Bl.1

621.3 Electrical Engineering

Austria

Steel-Aluminum and Aluminum Alloy Cables for Overhead Power Lines, ÖNORM E4004
Classification of High-Voltage Insulators for Overhead Power Lines From 1 to 220 kv, ÖNORM E4119

The Netherlands

Telephone Ground Cable, With Air and Paper Insulation, Conductors 0.6 mm and 0.8 mm in Diameter, N 939

United Kingdom

Schedule of Projector Lamps, BS 1522-1949
Domestic Electrical Installations, BS Handbook No. 9
Moulded Electrical Insulating Materials for Use at High Temperature, BS 1539-1949
Moulded Electrical Insulating Materials for Use at Radio Frequencies, BS 1540-1949

621.64 Devices for Conveyance and Storage of Gases and Liquids in General

Switzerland

Various Types of Pressure Gage Valves for NP up to 640 and temperature up to 200 C and for NP up to 1000 and temperature up to 400 C, VSM 19216 through 19219

United Kingdom

Flanged Steel Outside-Screw-and-Yoke Wedge Gate Valves for the Petroleum Industry, BS 1414-1949
Control Plug Cocks for Low Pressure Gas, BS 1552-1949

621.79 Various Workshops and Processes for Treatment of Metals

Union of South Africa

Silver Solders, SABS 23-1948
Soft Solders, SABS 24-1948

Union of Soviet Socialist Republics

Wooden Cases for Packing Fowl, GOST 3261-46

United Kingdom

Nomenclature of Decorative Metallic Finishes, BS 1448-1948

621.8 Machine Parts. Hoisting and Conveying Machinery. Power Transmission. Means of Attachment. Lubrication

Austria

Oils and Greases for Technical Uses, ÖNORM C2003

Germany

Metric Thread for Diameters From 0.3 mm to 68 mm (Theoretical Data) DIN 13, Bl.1 (7th edition)
Flat Fillister Head Screws, Sizes M1 to M36, DIN 84
Oval Head Machine Screws, Sizes M1 to M52, DIN 88 Riveting Tool, DIN 6459

Switzerland

V-Belt Drives. General Instructions, VSM 15420
V-Belt Pulleys. Dimensions, VSM 15421

623.8 Naval Construction

France

Fire and Wash Pipe Lines. Valves, NF J41-605

631.3 Agricultural Tools and Machinery

Union of Soviet Socialist Republics

Seeding Machines. Disk Drill, GOST 1719-42
Agricultural Machines. Sorting Cylinders, GOST 2277-43
Winnowing Machines. Test Method, GOST 3949-47

United Kingdom

Agricultural Tractor Details, BS 1495-1948

651 Office Organization. Office Management

United Kingdom

Commercial Envelopes (Terms and Sizes), BS 917-1949
Office Furniture (Metal), BS 1558-1949

66 Chemical Industry

Mexico

Sodium Carbonate Calcined, DGN K36-1948
White Lead. Ceruse, DGN K37-1948

Union of Soviet Socialist Republics

Oil "Sulfofreezol", GOST 122-46
Tar Oil, GOST 783-47
Solvents, GOST 1928-42
Mercury Iodite (HgI_2), Reagent, GOST 3206-46
Calcium Sulfate ($CaSo_4 \cdot 2H_2O$), Reagent, GOST 3210-46
"Lacoil", a Petroleum Product, GOST 3540-47
Benzol, Rectified, OST 10463-39
Zylol, Rectified, OST 10465-39

United Kingdom

Precipitated Calcium Carbonate (Determination of Density After Compaction), BS 1460-1948

661.42 Salt. Rock Salt. Sea Salt

Union of South Africa

Standard Specifications for Salt, SASS 12-1948

662 Pyrotechnics. Explosive Materials. Combustibles

France

Solid Combustibles. Sampling, NF MO3-001

Union of Soviet Socialist Republics

Coke, GOST 3213-48

665 Oils. Fats. Waxes

France

Vegetable Fats. Nomenclature, NF T60-001

Mexico

Coconut Oils, DGN F14-1948

Union of Soviet Socialist Republics

Sunflower Oil, GOST 1129-41

United Kingdom

Home-Produced Technical Tallow, BS 1482
Home-Produced Technical Bone Grease, BS 1483
Tung Oil, BS 391-1949

668.3 Adhesives. Glue and Gelatin. Bone Processing. Albumen

United Kingdom

Cold-Setting Casein Glue for Wood, BS 1444
Animal Glue for Wood, BS 745

669 Metallurgy

France

Aluminum Alloys Used for Manufacture of Kitchen Utensils, NF D21-440

United Kingdom

Sampling Non-Ferrous Metals, BS 1499-1949
Nickel and Nickel Alloy-Bars, Rods and Sections for General Purposes, BS 1528-30-1949
Nickel and Nickel Alloy Wire for General Purposes, BS 1534-36-1949
Nickel Copper Alloy Castings, BS 1537-1949
Analyzed Samples for Metallurgical Analysis, BS 1548-1949
Rolled Brass and Naval Brass Condenser Tube Plates, BS 1541-1949
Electrically Welded Mild Steel Chain . . . For Lifting Purposes, BS 590-1949

671 Articles of Precious Metal, Of Precious Stones and of Metals Other Than Iron and Copper

Union of South Africa

Marking Articles Made of Sterling Silver, SABS 30-1948

674 Wood Industry

Austria

Blades for Woodworking Band Saw, ÖNORM M4403

Belgium

Wood, Its Anomalies, Defects and Diseases, NBN 189:1948

Union of South Africa

Creosoted Wooden Telephone, Telegraph, Electric Light and Power Transmission Poles, SASS 346-1948

Union of Soviet Socialist Republics

Boards of Softwood (Coniferous) Lumber for Small Boat Sidings, GOST 3151-46

United Kingdom

Guarding of Power Driven Woodworking Saws, SABS 45-1948
Code of Practice for the Application of Timber Preservatives, SABS 05-1949

677.53 Metal Tissue

United Kingdom

Galvanized Wire Netting, BS 1485

678 Rubber Industry

France

Determination of Acetonic Extract From Vulcanized Rubber, NF T46-100
Determination of Chloroformic Extract From Vulcanized Rubber, NF T46-101
Ash Percentage in Vulcanized Rubber, NF T46-103
Tires for Normal Trucks, NF T47-006
Tires for Heavy Trucks, NF T47-007
Changes in Mechanical Characteristics of Rubber After Immersion in Organic Liquids, NF T46-014
Rubber. Determination of Sodium-Alcohol Extract of Vulcanized Rubber, NF T46-102

Union of Soviet Socialist Republics

Rubber and Vulcanized Cloth Reinforced Hoses With Inner Helicoidal Steel Coil, GOST 3156-46
Rubber Nipples, GOST 3356-46

679.5 Plastics Industry in General

United Kingdom

Cellulose Acetate Moulding Materials, BS 1524-1949
Polystyrene Moulding Materials, BS 1493-1948
Synthetic Resin (phenolic) Moulding Materials, BS 771-1948

683 Hardware. Ironmongery. Lamps and Stoves

France

Various Types of Locks Used by Cabinet Makers, NF D69-11, -112, -113, -121, -122, -131, -141, -142, -143, -145, -146, -147, -149, -151, -152, -153, -158

Mexico

Household Gas Stoves. Specification, DGN B30-1948

687.2 Linen Goods. Underwear

United Kingdom

Toddlers, and Girls' Underwear and Nightwear (Utility and Non-Utility), BS 1445-1948

691 Building Materials

United Kingdom

Fixing Accessories for Building Purposes, BS 1494-1948

U.S. Represented At Oslo and London Meetings

Harold H. Watson, chairman of the ASA Sectional Committee on Standards for Lamp Bases and Holders, C81, has attended the semi-annual meeting of the International Commission for Ruling and Checking of Electrical Equipment (CEE) held in Oslo, Norway from June 28 to July 8. He also served as American delegate at the meeting of the Experts Preparatory Committee of the Committee on Electric Lamps, International Electrotechnical Commission (IEC 34) in London July 12 and 13.

At the meeting in Oslo, where representatives of the major European countries discussed international standards, for electric lamps, construction materials, appliances, and radios, Mr Watson served as an observer for the United States National Committee of the IEC. He was also the only American representative.

At the conferences in London, Mr Watson represented the United States National Committee of the IEC. He serves as technical advisor to the USNC on the subject of lamps.

Mr Watson is commercial engineer for the construction materials department of the General Electric Company in Bridgeport, Conn.

ASA STANDARDS ACTIVITIES

Status as of July 1, 1949

American Standards Approved Since June 3, 1949

Reamers, B5.14-1949 (Revision of B5.14-1941)

Sponsors: Metal Cutting Tool Institute; Society of Automotive Engineers; American Society of Mechanical Engineers; National Machine Tool Builders' Association

Specifications for White Floating Soap ASTM D499-48; ASA K60.4-1949

Specifications for Milled Toilet Soap D455-48; ASA K60.6-1949

Specifications for Compound Chip Soap (With Rosin) ASTM D690-48; ASA K60.8-1949

Sponsor: American Society for Testing Materials

Test for Cone Penetration of Lubricating Grease, ASTM D217-48; ASA Z11.3-1949

Test for Sulfated Residue, Lead, Iron and Copper in New and Used Suburating Oils, ASTM D810-48; ASA Z11.57-1949

Chemical Analysis for Metals in Lubricating Oils, ASTM D811-48; ASA Z11.56-1949

Test for Sediment in Fuel Oil by Extraction, ASTM D473-48; ASA Z11.58-1949

Definition of Terms Relating to Petroleum, ASTM D288-48; ASA Z11.28-1949

Test for Knock Characteristics of Motor Fuels by the Motor Method, ASTM D357-48; ASA Z11.37-1949

Sponsor: American Society for Testing Materials

Horticultural Standards, Z60.1-1949

Sponsor: American Association of Nurserymen

Letter Symbols for Electrical Quantities, Z10.5-1949

Sponsors: American Association for the Advancement of Science; American Institute of Electrical Engineers; American Society of Civil Engineers; American Society for Engineering Education; American Society of Mechanical Engineers

American Standards Being Considered for Approval

By the Standards Council—

Method of Test for Accelerated Aging of Vulcanized Rubber by the Oxygen-Pressure Method (Revision of ASTM D572-42; ASA J4.1-1943)

Method of Test for Accelerated Aging of Vulcanized Rubber by the Oven Method (Revision of ASTM D573-45; ASA J5.1-1945)

Sponsor: American Society for Testing Materials

Dimensions for Professional Portrait and Commercial Sheet Film (Centimeter Sizes), Z38.1.29 (Revision of Z38.1.29-1944)

Sheet Film Processing Tanks, Z38.8.15

Sponsor: Optical Society of America

By the Board of Examination—

Specifications for Lantern Slide Projectors, Z38.7.14 (Revision of Z38.7.14-1944)

Sponsor: Optical Society of America

Addenda to American Standard Approval Requirements for Domestic Gas Ranges, Z21.1 (Revision of Z21.1-1948)

American Standard Listing Requirements on Gas Hose for Portable Gas Appliances, Z21.2 (Formerly American Standard Listing Requirements for Flexible Gas Tubing, Z21.2-1938)

American Standard Approval Requirements for Domestic Gas-Fired Incinerators, Z21.6 (Formerly American Standard A.G.A. Approval Requirements for Incinerators, Z21.6-1932)

Addenda to American Standard Approval Requirements for Hot Plates and Laundry Stoves, Z21.9 (Revision of Z21.9-1948)

American Standard Approval Requirements for Gas Water Heaters, Z21.10 and Addenda (Revision of Z21.10-1944 and Addenda Z21.10-1945)

American Standard Approval Requirements for Gas-Fired Room Heaters, Z21.11 (Formerly American Standard Approval Requirements for Gas Space Heaters, Z21.11-1948)

Addenda to American Standard Listing Requirements for Gas Valves, Z21.15 (Revision of Z21.15-1944)

Sponsor: American Gas Association

By the Safety Code Correlating Committee

Safety Code for Rubber Mills and Calenders, B28.1 (Revision of B28a-1927)

Sponsor: National Safety Council

By the Mechanical Standards Committee—

Nomenclature, Definitions, and Letter Symbols for Screw Threads, B1.7

Sponsor: Society of Automotive Engineers; American Society of Mechanical Engineers

Standards Submitted—

Method of Rating and Testing Refrigerant Expansion Valves, B60

Recommended Practice for Mechanical Refrigeration Installations on Shipboard, B59

Sponsor: American Society of Refrigerating Engineers

Revisions Submitted—

National Electrical Code, C1

Sponsor: National Fire Protection Association

American Standards Being Considered for Reaffirmation

Jig Bushings, B5.6-1941

Rotating Air Cylinders, B5.5-1932

Machine Tapers, Self Holding and Steep Taper Series, B5.10-1943

Spindle Noses and Arbors for Milling Machines, B5.18-1943

Sponsor: American Society of Mechanical Engineers

American Standard Withdrawn

Miscellaneous Outside Coal Handling Equipment, M10-1928

Withdrawal of American Standards Being Considered

Test for Tetraethyl Lead in Gasoline, ASTM D526-42; ASA Z11.48-1942

Approval Requirements for Private Garage Heaters, Z21.4-1932

Approval Requirements for Gas Heated Ironers, Z21.7-1932

Approval Requirements for Industrial Gas Boilers, Z21.14-1934

Listing Requirements for Low Water Cut-Off Devices, Z21.36-1945

Requested by: American Gas Association

New Project Initiated

Deep Well Vertical Pumps, B58

Sponsor: American Water Works Association.

Fluid Permeation, Z59

Sponsors: American Geophysical Union; Geological Society of America

Project Withdrawn

Stock Sizes, Shapes and Lengths for Iron and Steel Bars, Including Flats, Squares, Rounds and Other Shapes, B41

Unification of Rules for the Dimensioning of Furnaces for Burning Solid Fuel, B50

What's Happening On Projects

Plastering, A42—

Sponsors: American Institute of Architects; American Society for Testing Materials

Recent study by Sectional Committee A42 of the American Standard Specifications for Gypsum Plastering Including Requirements for Lathing and Furring, A42.1-1946, has indicated the desirability of separating the document into two separate standards and modifying the text in a number of places. Separation of the standard is under consideration because many of the sections concerned with lathing and furring are also applicable to the standards on cement plastering and cement stucco. It is expected that this committee work should be completed late this fall, so that the committee's recommendations can be acted upon by the sponsors and by the ASA early in 1950.

Detailed information on the recommendations now being studied by the sectional committee may be obtained from the secretary, J. W. McBurney, National Bureau of Standards, Washington 25, D.C.

Standardization and Unification of Screw Threads, B1—

Sponsors: The American Society of Mechanical Engineers; The Society of Automotive Engineers

The sponsors have submitted the proposed American Standard Nomenclature, Definitions and Letter Symbols for Screw Threads, B1.7 to the ASA for approval. This standard covers the nomenclature for all types of screw threads. Before it was compiled, the related nomenclature was a part of each separate standard for screw threads. This is the first effort to standardize the terminology and definitions common to one or more screw thread standards.

It is hoped that all new revisions of screw thread standards will follow the newly established pattern on definitions and symbols.

When issued, this standard will be in accord with the corresponding proposals to be issued as Canadian and British standards.

Ball and Roller Bearings, B3—

Sponsors: American Society of Mechanical Engineers; Society of Automotive Engineers

A proposed American Standard, Gaging Practices for Ball and Roller Bearings, B3.4, has been prepared by the sectional committee and is now before the committee for final approval.

International aspects of the committee's program, which involves taking an active part in the work of ISO/TC 4, Ball and Roller Bearings, will be handled by a subcommittee consisting of S. H. Stoner, chief engineer, New Departure Division, General Motors Corporation, *chairman;* L. A. Cummings, Marlin-Rockwell Company; Hudston T. Morton, Fafnir Bearing Company; and R. M. Riblet, Timken Roller Bearing Company.

American delegates to the ISO/TC 4 meetings at Paris in June were Fayette Leister, vice-president in charge of engineering, Fafnir Bearing Company; R. N. Riblet, chief engineer, Automotive Division, Timken Roller Bearing Company; and A. L. Bergstrom, Timken Roller Bearing Company. A series of recommendations were developed by the subcommittee in cooperation with technical committees of the Anti-Friction Bearing Manufacturers Association, based upon the proposed American Standards already approved by the sectional committee.

Small Tools and Machine Tool Elements, B5—

Sponsors: American Society of Mechanical Engineers; Metal Cutting Tool Institute; National Machine Tool Builders' Association; Society of Automotive Engineers

Punch and Die Sets—A proposed American Standard for design and dimensions of punch and die sets for two post, punch press tools has been completed by Technical Committee No. 9 and submitted to the sectional committee for approval. Two series of punch and die sets are covered, consisting of back-post sets and diagonal-post sets. The punch and die sets shown are of the conventional type with pressed-in guideposts and guidepost bushings; however, the standardized die areas may also apply to die sets having patented mountings for the guideposts and guidepost bushings.

The committee reports that the types and range of sizes covered have been carefully selected with a view to meeting the largest volume of the present needs of the users and, therefore, may be manufactured on a continuous production basis. Tolerances established are expected to assure a high grade tool which can be maintained commercially in respect to the component parts and assembly. As general engineering and manufacturing requirements demand additional sizes of the present styles, or call for other styles, such as floating-adapter, center-post, four-post, and subpress sets, it is expected that these will be added from time to time.

When approved by the sectional committee, this proposed American Standard will be sent to the sponsor organizations for recommendation to the American Standards Association.

Standardization of Gears, B6—

Sponsors: American Society of Mechanical Engineers; American Gear Manufacturers Association

A reorganization meeting was held June 9, at which Professor A. W. Luce of Pratt Institute was elected chairman; Ted Rideaut of Otis Elevator Company, vice-chairman; and Louis Martin, Eastman Kodak Company, secretary.

The committee proposed a new scope for its work:

"Standardization of toothed gearing with respect to design, manufacture, and use."

This proposed scope would take the place of the more specific enumeration of types of gearing and subjects given in the scope under which the committee has been working in the past.

Bolt, Nut and Rivet Proportions, B18—

Sponsors: The American Society of Mechanical Engineers; Society of Automotive Engineers

Plow Bolts—The American Society of Mechanical Engineers, as administrative sponsor for Sectional Committee B18, announces the distribution for comment of a proposed revision of the 1928 edition of the American Standard for Plow Bolts. This proposal has been prepared following circulation of a previous draft to industry for review in the fall of 1948. The comments received at that time have been incorporated in the present draft. The committee hopes that the recommendations given in this proposed American Standard will satisfy requirements of new designs and for service of existing equipment.

The proposed standard recommends the use of the No. 3 square neck, 80-deg round countersunk head and the No. 7 reverse key, 60-deg round countersunk head plow bolts for new designs. It includes standards on No. 3 square neck, round countersunk repair head; No. 4 countersunk, square repair head; No. 6 heavy key, round countersunk repair head; and No. 7 reverse key, round countersunk repair head for service purposes. Dimensions of the No. 4 countersunk square regular head and the No. 6 heavy key, round countersunk regular head are given in the appendix, as information supplementing but not forming a part of this proposed standard.

Features of the No. 3 and No. 7 head designs which make it advisable to use one or the other in a particular design are included for the convenience of designers.

Copies of the Proposed American Standard for review and comment can be obtained from S. A. Tucker, Standards Manager, American Society of Mechanical Engineers, 29 West 39 Street, New York 18, N.Y.

Mechanical Refrigeration on Shipboard, B59—

Method of Rating and Testing Refrigerant Expansion Valves, B60—

Sponsor: American Society of Refrigerating Engineers

The American Society of Refrigerating Engineers has submitted its Standard on Refrigeration Installations on Shipboard, 26, and its Standard on Methods of Rating and Testing Refrigerant Expansion Valves, 17-R, to the ASA for approval as American Standard.

The standard on installations was completed December, 1948, as the result of the work done by the ASRE committee composed of large machinery and accessory manufacturers, steamship designers, steamship operators, and representatives from the Federal Government. "In view of the importance of this standard to the marine industry at large, we feel that it should be adopted by ASA as an industry standard," the society declared in submitting it to the ASA for approval.

The standard on refrigerant expansion valves is a revision of an ASRE standard developed in 1938. The purposes of this standard are to list and define the terms used in rating, to specify the data required, to establish conditions and methods of test for obtaining standard ratings, and to specify the method of determining maximum pressure of thermostatic expansion valves provided with pressure limiting means.

Radio, C16—

Sponsor: Institute of American Engineers

The revised scope of this committee has been approved and is as follows: "Nomenclature, methods of testing and of rating, specifications for radio apparatus, equipment and components, and dimensions to secure interchangeability where this may be found to be desirable. Electron tubes are not included."

Electrical Measuring Instruments, C39—

Sponsor: Electrical Standards Committee

The scope of this committee has been revised to exclude measuring instruments which are basically electronic instruments. The scope now is as follows: "Definitions, classification, rating, methods of test, and construction details for all types of electrical measuring instruments but not including: (1) watthour meters, (2) demand devices and their auxiliary apparatus, (3) low precision or special instruments, and (4) measuring instruments which are basically electronic instruments."

Transformers, Regulators and Reactors, C57—

Sponsor: Electrical Standards Committee

F. L. Snyder of the Westinghouse Electric Corporation, representing the American Institute of Electrical Engineers, has been elected chairman of this committee. He succeeds V. M. Montsinger who resigned

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because of his retirement from the General Electric Company. Mr Montsinger had been chairman since 1933 when the C57 committee was organized to replace several former committees. During his term as chairman, two major editions of the transformer standards have been made. To show how the work has grown—the 1941 edition contained only 96 pages while the 1948 edition is about 2½ times as large. Mr Montsinger has also represented the United States at several meetings of the International Electrotechnical Commission on Transformers, the latest having been in March 1949.

Standardization of Electron Tubes, C60—

Sponsor: Joint Electron Tube Engineering Council

O. W. Pike of the General Electric Company, representing the JETEC, has been named chairman of this committee, and Virgil M. Graham of the Sylvania Electric Products, Inc, representing the Radio Manufacturers Association, has been named secretary.

Mr Pike succeeds D. Ulrey of the RCA Manufacturing Company who was a representative of the National Electrical Manufacturers Association and was chairman.

Lamp Ballasts, C82—

Sponsor: Electrical Standards Committee

The sectional committee has requested ASA Sectional Committee on Standards for Electric Lamps, C78, to review its "design starting voltage" specifications in order to bring certain of them into line with operating experience and, in the case of the long-tube lamps, to decide whether lower starting voltages might be acceptable under special starting arrangements. This request was made at the meeting of Sectional Committee C82 in Cleveland on May 26.

Miscellaneous Outside Coal Handling Equipment, M10—

The Mining Standardization Correlating Committee has studied this project as part of the careful study it has been giving projects under its jurisdiction. It found that the standard approved in 1928 is obsolete because of changes in coal mining practices that have led to changes in design and methods of operating coal handling equipment on the surface. As a result of its recommendations, the Standards Council at its meeting June 16 confirmed the MSCC action in discontinuing the project. The standard was withdrawn by action of the Board of Review. It is expected that the MSCC may recommend new work on some of the subjects under the jurisdiction of this committee.

Acoustical Measurements and Terminology, Z24—

Sponsor: Acoustical Society of America

The proposed American Standard Test Code for Apparatus Noise Measurement, Z24.7/225, is being voted on by the sectional committee to decide whether the proposed standard should be sent to its sponsors for recommendation to the ASA for approval as an American Standard.

Subcommittee B on fundamental sound measurements is well on the way in its work on a fourth standard concerning the secondary calibration of microphones.

Subcommittee C on noise measurements and sound level meters has reported that in connection with the redrafting of American Standard Z24.2 on noise measurement and in connection with the consideration of material submitted to the ASA by the British Standards Institution it was agreed to adopt the sone as the loudness unit and to recommend that one sone (1000 LU) be taken as the loudness of a sound having a loudness level of 40.0 phons. This subcommittee hopes to be kept informed of future progress made by the British Standards Institution and the International Organization for Standardization in the field of noise measurement. In order to exchange reports on the progress being made, the sectional committee has voted to send the minutes of its meetings to the British Standards Institution.

A new chairman has been appointed to head the Subcommittee on Vibration and Shock Measurement, Z24H. He is Dr Howard A. Leedy of the Armour Research Foundation.

Graphical Symbols and Abbreviations for Use on Drawings, Z32—

Sponsors: American Institute of Electrical Engineers; American Society of Mechanical Engineers

Heat-Power Apparatus—A proposed new American Standard providing Graphical Symbols for indicating heat-power apparatus on drawings is being distributed for comment by the American Society of Mechanical Engineers, joint sponsor. Clarity and simplicity have been considered in assembling these symbols, the committee explains. Whenever possible, simplification in the drafting has been considered and identification letters have been used only when there has been a question of possible error because of similarity of form. Only symbols on which there is nationwide consensus have been included. The 44 symbols shown are a minimum requirement.

Copies can be obtained from S. A. Tucker, Standards Manager, The American Society of Mechanical Engineers, 29 West 39th Street, New York 18, N. Y.

Standards in Optics, Z58—

Sponsor: Optical Society of America

Two proposed standards have just been issued by subcommittees of this sectional committee—one on nomenclature and definitions in the field of colorimetry and the other on nomenclature for radiometry and photometry. An opportunity is being given those interested to comment on the standards before final vote is taken by the sectional committee.

In addition to definitions of terms, the proposed American Standard on nomenclature and definitions in the field of colorimetry, Z58.1.2, includes the 1931 standard observer table of the International Commission on Illumination, showing distribution coefficients for equal-energy stimulus. Relative luminosity factors (unity at wavelength of maximum luminosity) are given in Table 2.

The proposed American Standard Nomenclature for Radiometry and Photometry, Z58.1.1, includes terms used to describe processes, devices, quantities, and the properties of devices. The appendix gives a discussion of the philosophy on which the terms are based. The two roots, "radi-" and "lumin-" are used exclusively to characterize radiometric and photometric terms, it is explained. The adjectives (radiant) and (luminous) may be omitted in cases where the meaning is unmistakable. This will most usually be true in the case of transmission, reflection, and absorption. Two suffixes have been assigned special significance. Thus, "-ion" refers exclusively to processes and "-or" refers exclusively to devices.

The suffix "-ance" is used in all terms referring to properties of devices but it is not confined to such terms. New terms, "lumination" and "luminator," refer to processes and devices less specialized than "illumination" and "illuminator." "Lumination" refers to emission, propagation, and distribution of light as well as to illumination. "Luminator" may be considered synonymous with "luminous source" but it is more general. It is recommended as a substitute for the word "illuminant" in the name "ICI Standard Illuminant A (B or C)."

Radiant flux density and luminous flux density refer to the radiant or luminous flux per unit area. These are general concepts, of which radiant emittance and irradiance (or luminous emittance and illuminance) are special cases.

"Illuminance" is recommended for the name of the quantity which specifies the level or amount of illumination. Illuminance is a purely photometric quantity. Use of this name releases "illumination" for general use, referring to the fact of illumination, the means of illumination, and the quality of illumination.

"Luminance" is recommended for the name of the photometric quantity which has been called brightness. Luminance is a purely photometric quantity. Use of this name permits "brightness" to be used entirely with reference to the sensory response. The photometric quantity has often been confused with the sensation merely because of the use of one name for the two distinct ideas, the committee explains. Brightness will continue to be used, properly, in nonquantitative statements, especially with reference to sensations and perceptions of light.

A photoelectric instrument calibrated in foot-lamberts should not be called a "brightness meter." If correctly calibrated, it is a "luminance meter."

Copies of these two proposed American Standards can be obtained from the American Standards Association. Comments should be sent to Professor F. W. Sears, Department of Physics, Massachusetts Institute of Technology, Cambridge 39, Mass.

New Projects Being Studied

Representatives of national organizations interested in sanitary conditions in bakeries met at the offices of the American Standards Association June 30 to discuss the possibility of developing a nationally recognized code for bakery sanitation. The meeting was called following a request of the American Society of Bakery Engineers for an ASA project. The purpose was to determine whether or not members of the baking industry and allied fields believe there is a definite need for a committee to be formed under the procedure of the American Standards Association to formulate a sanitation code for the baking industry.

The members present at the conference decided to appoint a committee to look into this question further. The committee is to analyze the situation and to investi-

gate what is being done in the field by other organizations. It will then report back to the conference either at another meeting or by correspondence and the conference will then make recommendations to the American Standards Association as to whether or not work should be undertaken.

Problems connected with fluid permeation, of special concern to all who are working with soils and the flow of fluids through the different materials that make up the earth, will be studied in a new project just authorized by the Standards Council of the American Standards Association. The organization of a sectional committee under the procedure of the ASA was requested by the American Geophysical Union. The Union and the Geological Society of America have been named joint sponsors. A committee of the AGU, which has been working on the subject for some years, will be the basis for organization of the committee.

The scope of the work will include a study of the permeability to fluids of various materials as well as problems of fluid permeation. It is not concerned with permeability as this term has previously been used in electricity, magnesium, and metallurgy.

It is expected that in its work the proposed new committee will define the term permeability and may rename other terms in the field of fluid permeation that have been called permeability in the past. It is also expected to outline the mechanics of fluid permeation, as restricted to ideal homogeneous fluids and to media with which there is no interaction. As part of its final goal, the committee may establish a standard unit of permeability and a mathematical symbol for permeability.

Supplement Is Issued On Flange Rating Standard

In response to an urgent need for a revised edition of the Steel Pipe Flange and Flanged Fittings Standard (B16e-1939), Sectional Committee B16 has concentrated on the most needed sections and has issued Supplement No. 1 to B16e-1939. This supplement will serve until the committee can complete a revision of the whole standard.

When steel flanges were first standardized many years ago, the theory of flange design was not as thoroughly understood as it is today. Those working on these early standards fully realized their shortcomings and established flanges of very conservative design. During the intervening years, exhaustive investigations have been made on the design of flanges. With this additional knowledge at its disposal, the committee appointed a special task group in 1941 to restudy the design of the B16e flanges.

This task group had been functioning for only a short time when the United States became involved in World War II. Faced with the imperative need for conserving strategic materials, it appeared that much steel could be saved if flanged steel piping materials could be used on a less conservative basis than established by the old standards. The task group was constituted as an ASA War Committee and proceeding under the rules established for developing American War Standards completed the American War Standard Pressure-Temperature Ratings for Steel Pipe Flanges, Flanged Fittings and Valves, B16e5-1943.

In making its study, the task group realized that to change the dimensions of the flanges would result in untold confusion, sacrifice the benefits of interchangeability, and force the expenditure of large sums for jigs, fixtures, and other tooling creating further consumption of steel and thus defeat the very purpose the changes were expected to accomplish. The committee therefore made no dimensional changes in the standard whatsoever, but analyzed the flange stresses in the light of the latest engineering data available and established new higher service ratings for the flanges. Thus, in many cases, lighter weight flanges could be used than would have been necessary under the old, more conservative ratings. In establishing these new ratings, the task group first made probing calculations by choosing several flanges of each pressure class and found that the 900-lb flanges were the least conservative in their design. They then calculated each flange of this series and from these calculations established safe usable ratings in accordance with the best engineering practice. The other pressure classes were then made proportional to the 900-lb flanges. It was fully realized that because the 900-lb flanges were the least conservative, the other series could have even higher ratings in proportion to the degree of conservatism embodied in the design of each class. The additional amount of steel which could be saved however, would be negligible in comparison to the drawbacks of such a basis of ratings.

With cessation of hostilities the order making use of the war standard ratings mandatory was withdrawn, leaving the War Standard without official status from a practical standpoint. Immediately confusion reigned. Codifying authorities had not changed their documents to recognize the war ratings and some were reluctant to do so. They believed that not enough experience had been gained in the use of the war ratings and also that the ratings had been established under the stress of war emergency and not by the usual sectional committee.

Those who had made installations at the new ratings were confident that they were sound and did not want to return to the old, more conservative ratings. They stressed the fact that several thousand dollars could be saved in many cases by designing a plant with the new rated materials and that such plants which had been erected were operating satisfactorily.

Sectional Committee B16 was under great pressure to take action that would correct this situation. A special task group under the chairmanship of N. O. Smith-Petersen, who had served as chairman of the War Committee also, was formed to restudy the whole matter of ratings. At the same time the MSS Ferrous Flange Committee approached the problem from an entirely new angle by relating the flange stresses to the physical property curves of carbon and carbon molybdenum steels through the entire temperature range. Nearly eight thousand individual flange calculations were made by members of the committee. The results of this approach gave ratings almost the same as the war ratings and this information was turned over to the task force. The task force's studies also substantiated the new ratings and reports were made to the main sectional committee. After due deliberation the committee decided that as the task force's ratings were so close to the war ratings a third set would only complicate matters further and that the numerical values in the war rating tables should be adopted.

As a result, Supplement No. 1 was approved which concurrently cancelled the war standard B16e5-1943 and revised the rating tables of the peacetime standard B16e-1939.

In addition to revising the rating tables of B16e-1939, Supplement No. 1 also brings the material sections up-to-date and also establishes shell thicknesses for welding end valves. The committee has already started the task of revising the whole standard B16e-1939 and Supplement No. 1 will be incorporated in the completely revised standard when it is issued.

New American Standards Available

ASA Number	Title of Standard	Price
B1.1-1949	**Unified and American Screw Threads for Screws, Bolts, Nuts, and Other Threaded Parts**	$3.00

This revised edition of B1.1 contains the Unified Thread standards agreed upon by standardization committees of the United States, Canada, and Great Britain, and constitute the basic American Standards. (*Sponsors:* Society of Automotive Engineers; The American Society of Mechanical Engineers)

B6.5-1949	**Letter Symbols for Gear Engineering**	.30

A uniform practice is set forth for mathematical notation for equations and formulas dealing with toothed gearing. (*Sponsors:* American Gear Manufacturers Association; The American Society of Mechanical Engineers)

B16e6-1949	**Supplement No. 1 to Steel Pipe Flanges and Flanged Fittings, B16e-1939**	.40

This supplement covers revisions of the pressure-temperature rating tables and material specification references, superseding the corresponding parts of B16e-1939. (*Sponsors:* Heating, Piping, and Air Conditioning Contractors' National Association; Manufacturers' Standardization Society of the Valve and Fittings Industry; The American Society of Mechanical Engineers)

Proposed American Standards for Dimensional and Electrical Characteristics of Fluorescent Lamps:

C78.400/377	4-Watt T-5 General Service	.25
C78.401/378	6-Watt T-5 General Service	.25
C78.402/379	8-Watt T-5 General Service	.25
C78.403/380	14-Watt T-12 General Service	.25
C78.404/381	15-Watt T-8 General Service	.25
C78.405/382	15-Watt T-12 General Service	.25
C78.406/383	20-Watt T-12 General Service	.25
C78.407/384	30-Watt T-8 General Service	.25
C78.408/385	40-Watt T-12 General Service	.25
C78.409/386	85-Watt T-17 General Service	.25
C78.600/387	40-Watt T-12 Instant Start	.25
C78.601/388	40-Watt T-17 Instant Start	.25
C78.801/389	42-Inch T-6 Long-Tube Hot-Cathode Multiple-Burning	.25
C78.803/390	64-Inch T-6 Long-Tube Hot-Cathode Multiple-Burning	.25
C78.805/391	72-Inch T-8 Long-Tube Hot-Cathode Multiple-Burning	.25
C78.807/392	96-Inch T-8 Long-Tube Hot-Cathode Multiple-Burning	.25
C78.1100/393	20-Millimeter 52-Inch Cold-Cathode Series-Burning	.25
C78.1101/394	20-Millimeter 64-Inch Cold-Cathode Series-Burning	.25
C78.1102/395	20-Millimeter 76-Inch Cold-Cathode Series-Burning	.25
C78.1103/396	20-Millimeter 84-Inch Cold-Cathode Series-Burning	.25
C78.1104/397	25-Millimeter 93-Inch Cold-Cathode Series-Burning	.25
C78.1105/398	20-Millimeter 93-Inch Cold-Cathode Series-Burning	.25
C78.1200/399	8-Watt T-5 Bactericidal Lamp	.25
C78.1201/400	15-Watt T-8 Bactericidal Lamp	.25
C78.1202/401	30-Watt T-8 Bactericidal Lamp	.25

This entire series is available at $2.75; in a binder $4.50. Discount is given on quantity orders.

These 25 Proposed American Standards present for trial and criticism dimensional and electrical characteristics of fluorescent lamps. (*Sponsor:* Electrical Standards Committee)

G48.1-1949	**Malleable Iron Castings, Specifications for (ASTM A47-48)**	.25

These specifications cover malleable iron to be used in castings for railroad, marine, motor vehicle, agricultural implement, and general machinery purposes. (*Sponsor:* American Society for Testing Materials)

L14.23-1949	**Testing Cotton Fibers, Methods of (ASTM D414-47T)**	.35
L14.26-1949	**Fineness of Wool, Methods of Test for (ASTM D419-47T)**	.25
L14.29-1949	**Fineness of Wool Tops, Specifications and Methods of Test for (ASTM D472-47T)**	.25
L14.32-1949	**Fiber Length of Wool, Method of Test for (ASTM D519-40)**	.25
L14.35-1949	**Testing Woven Asbestos Cloth, Methods of (ASTM D577-42)**	.25
L14.52-1949	**Testing Felt, Methods of (ASTM D461-47)**	.25

Test procedures for important characteristics of these fabrics are given in six standards. (*Sponsor:* American Society for Testing Materials)